

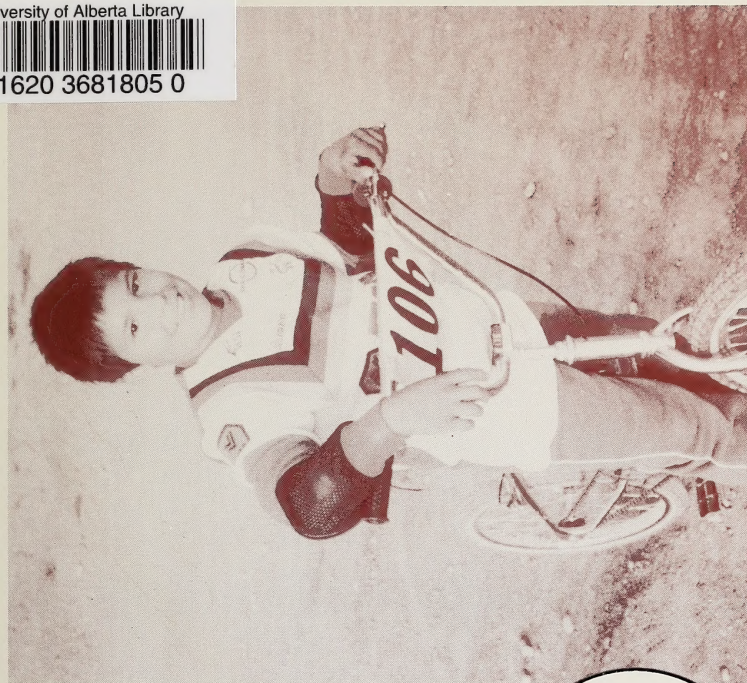
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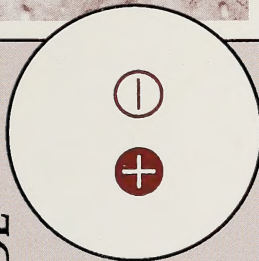
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WHOLE NUMBERS  
and INTEGERS

MODULE 2

STUDENT SUPPORT GUIDE



# MATHEMATICS 7



Alberta  
EDUCATION





# Mathematics 7

## Module 2: Whole Numbers and Integers

### STUDENT SUPPORT GUIDE

CANADIANA

AUG 8 1991

## Note to the Parent or Guardian

This Mathematics Student Support Guide contains answers to activities in the accompanying Module Booklet. It should be kept secure by the parent or guardian if the student is under 16 years of age. Younger students should not have access to this Guide except under supervision.

This Student Support Guide does not contain the answers to the accompanying Assignment Booklet. The Assignment Booklet will be graded by the student's distance education teacher.

Mathematics 7  
Student Support Guide  
Module 2  
Whole Numbers and Integers  
Alberta Distance Learning Centre  
ISBN No. 0-7741-0129-6

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## MODULE INTRODUCTION

### What Lies Ahead

In this module students will be working with whole numbers and integers.

Part One (Sections 1-13) deals with the background skills needed for the module.

Part Two (Sections 14-20) deals with mental computation and order of operations.

Part Three (Sections 21-30) deals with multiples, factors, powers, and integers.

### Gathering Materials

The student will need the following items for the introduction.

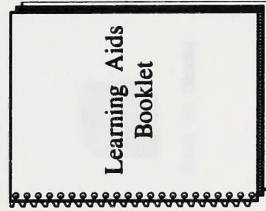
Mathematics 7

Module 2

*Whole Numbers  
and Integers*



Learning Aids  
Booklet



### Guiding the Student

- Have the student preview the module booklet and *Learning Aids Booklet* for Module 2 and then have the student read the Module Introduction in the module booklet.
- Next discuss the learning process, time management, and evaluation with the student. (See the suggestions on the next page of this booklet.)

## The Learning Process

Each section of Module 2 deals with a different skill involving whole numbers or integers.

Sections have several activities.

- Learning Aids Activities or Introductory Activities
- Practice Activities
- Extra Practice
- Concluding Activities

Remind the student that he/she will not be expected to do all the activities. You will help him/her decide what to do.

## Time Management

Decide how long the student will need to complete the module. (The average student should spend about 9 weeks or 22.5 hours to complete the module. It is recommended that students spend no more than 1 hour at a time doing mathematics.)

## Evaluation

Explain that the grade on Module 2 is based on work in the assignment booklet. The module booklet will help prepare the student for the assignment booklet.



## GETTING SET

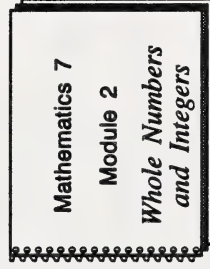
### What Lies Ahead

In this section the student will review these skills.

- reading and writing whole numbers
- comparing and ordering whole numbers
- rounding whole numbers
- adding, subtracting, multiplying, and dividing whole numbers
- estimating
- computing answers using paper and pencil and a calculator
- checking the reasonableness and accuracy of computations

### Gathering Materials

For this section the student will need the following items.



Base 10 Blocks

### Guiding the Student

- Have the student read the “What Lies Ahead” box and “Working Together” of Section 1 in the module booklet.
- Next have the student do the Pretest.
- Afterwards help the student check the answers. Suggested answers are on the next page of this booklet. It is not necessary for the student to correct errors at this time. See page 16 for further directions.

**Pretest**

1. Express in expanded form.

a. 2984

b. 30278

c. 2360585

2. Express in standard form.

a.  $8\,000 + 300 + 40 + 7$

b.  $(1 \times 100\,000) + (3 \times 10\,000) + (8 \times 100) + (2 \times 1)$

c. five hundred ninety

d. three million seventy-six thousand two hundred eighty-eight

**Suggested Answers**

1. a.  $(2 \times 1000) + (9 \times 100) + (8 \times 10) + (4 \times 1)$

b.  $(3 \times 10\,000) + (2 \times 100) + (7 \times 10) + (8 \times 1)$

c.  $(2 \times 1\,000\,000) + (3 \times 100\,000) + (6 \times 10\,000) + (5 \times 100) + (8 \times 10) + (5 \times 1)$

2. a. 8347

b. 130802

c. 590

d. 3076288



3. Write in words.

a. 1 024

b. 13 545 600

4. Order from greatest to least.

a. 19, 911, 91, 191, 90

b. 1234, 3421, 3241, 4321, 1423

5. Tell whether the numbers are exact or rounded.

a. The bird survey recorded over 1800 warblers.



b. Edmonton has about 600 000 people.

c. August has thirty-one days.

3. a. One thousand twenty-four

b. Thirteen million five hundred forty-five thousand six hundred

4. a. 911, 191, 91, 90, 19

b. 4321, 3421, 3241, 1423, 1234

5. a. rounded

b. rounded

c. exact

Words such as *over* and *about* indicate a rounded number.

6. Complete.

	Rounded to the nearest		
	ten	hundred	thousand
a. 879	880	900	1 000
b. 8 528	8 530	8 500	9 000
c. 94 846	94 850	94 800	95 000

7. Estimate.

$$\begin{array}{r} \text{a.} \quad 64 \\ + 29 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 52\,876 \\ + 8\,093 \\ \hline \end{array}$$

$$\text{c.} \quad 94 - 37$$

$$\begin{array}{r} \text{d.} \quad 187\,201 \\ - 88\,193 \\ \hline \end{array}$$

7. Answers will vary depending on method.

Rounding Front-end Digits

$$\begin{array}{r} \text{a.} \quad 60 \\ + 30 \\ \hline 90 \end{array}$$

$$\begin{array}{r} \text{b.} \quad 53\,000 \\ + 8\,000 \\ \hline 61\,000 \end{array}$$

$$\begin{array}{r} \text{c.} \quad 90 \\ - 40 \\ \hline 50 \end{array}$$

$$\begin{array}{r} \text{d.} \quad 190\,000 \\ - 90\,000 \\ \hline 100\,000 \end{array}$$



$$\begin{array}{r} \text{e.} \quad 28 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Rounding} \\ \text{e.} \quad 30 \\ \times 20 \\ \hline 600 \end{array}$$

$$\begin{array}{r} \text{Front-end Digits} \\ 20 \\ \times 10 \\ \hline 200 \end{array}$$

$$\text{f. } 307 \times 68$$

$$\begin{array}{r} \text{Rounding} \\ \text{f.} \quad 300 \\ \times 70 \\ \hline 21\,000 \end{array}$$

$$\begin{array}{r} \text{Front-end Method} \\ 300 \\ \times 60 \\ \hline 18\,000 \end{array}$$

$$\text{g. } 7 \overline{)33310}$$

$$\text{g. } 30\,000 \div 10 = 3\,000$$

$$33\,000 \div 7 \approx 4\,714$$

$$\text{h. } 4233 \div 63$$

$$\text{h. } 4200 \div 60 = 70$$

$$4000 \div 60 \approx 66.7$$

8. Model the following using base 10 blocks.

a.  $65 + 38$

**Step 1.** Form the numbers.




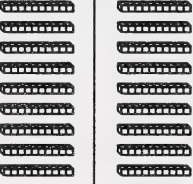
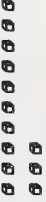




**Step 2.** Combine the pieces.

**Step 3.** Trade 10 units for 1 long.

**Step 4.** Trade 10 longs for 1 flat.

**Step 5.** Write the number sentence.

$$65 + 38 = 103$$

Flats	Longs	Units
		 
		
		
		



8. b.  $94 - 57$







**Step 1.** Form the numbers.

**Step 2.** Trade 1 long for 10 units because you cannot take away 7 units from 4 units.

**Step 3.** Take away the required pieces.

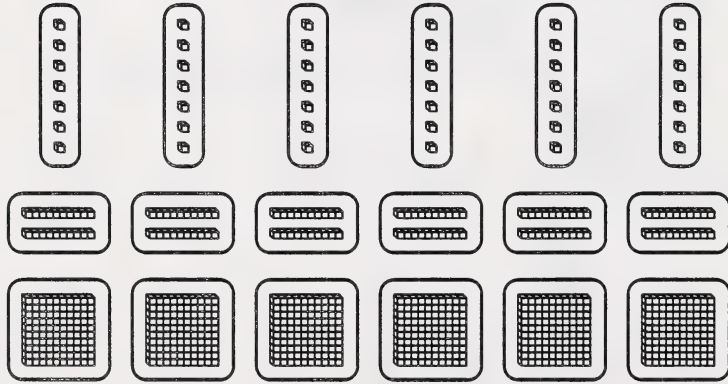
**Step 4.** Write the number sentence.

$94 - 57 = 37$

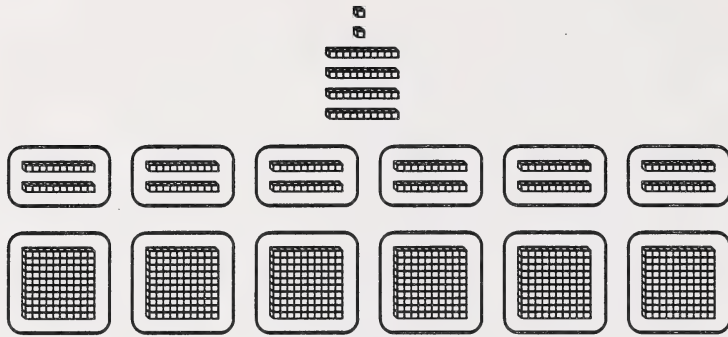
Flats	Longs	Units
		
		
		

8. c.  $127 \times 6 = 100 \times 6 + 20 \times 6 + 7 \times 6$

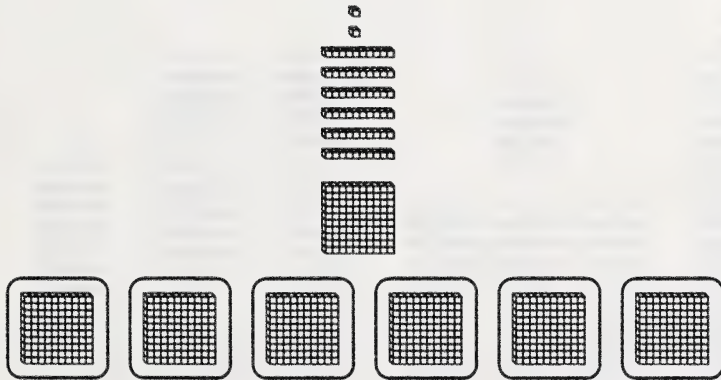
**Step 1.** Form 6 groups of 100, 6 groups of 20, and 6 groups of 7.



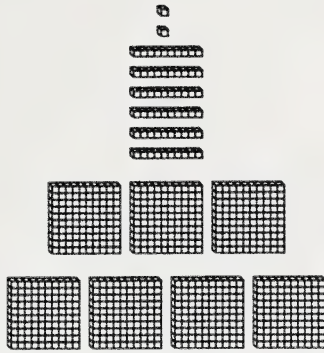
**Step 2.** Begin with 6 groups of 7 units. Trade 40 units for 4 longs. There are 2 units left.



**Step 3.** Next consider 6 groups of 2 longs. Trade 10 longs for 1 flat. There are 6 longs left over.



**Step 4.** Now consider 6 groups of 1 flat. There are 7 flats altogether.



**Step 5.** Write the number sentence.

$$127 \times 6 = 762$$



8. d.  $343 \div 7$

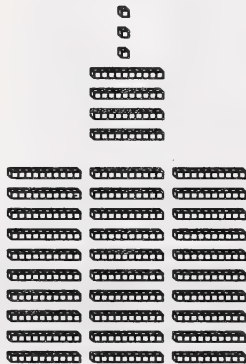
**Step 1.** Think about the meaning of division.

$343 \div 7$  can mean “in 343 there are 7 groups of how many?”

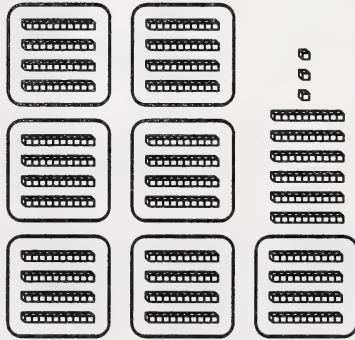
**Step 2.** Form 343.



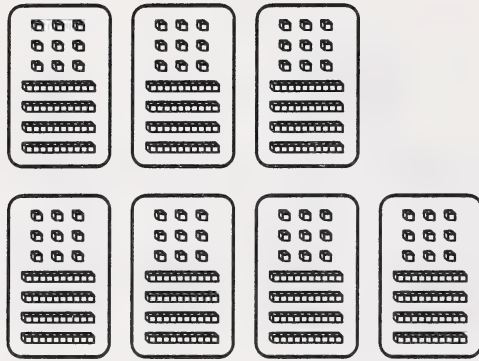
**Step 3.** Try to group the pieces into 7 groups. You cannot, so trade 3 flats for 30 longs.



**Step 4.** Arrange the longs into 7 groups.



**Step 5.** Trade 6 longs for 60 units. Then group the 63 units into 7 groups of 9.



**Step 6.** Write the number sentence.

$343 \div 7 = 49$

9. Compute the following. Do **not** use a calculator.

a.  $65 + 38$

9. a. 
$$\begin{array}{r} 65 \\ + 38 \\ \hline 103 \end{array}$$

b. 
$$\begin{array}{r} 53786 \\ + 8094 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 53786 \\ + 8094 \\ \hline 61880 \end{array}$$

c.  $94 - 57$

c. 
$$\begin{array}{r} 94 \\ - 57 \\ \hline 37 \end{array}$$

d. 
$$\begin{array}{r} 188203 \\ - 77192 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 188203 \\ - 77192 \\ \hline 111011 \end{array}$$

e.  $27 \times 6$

e. 
$$\begin{array}{r} 27 \\ \times 6 \\ \hline 162 \end{array}$$

f. 
$$\begin{array}{r} 586 \\ \times 32 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 586 \\ \times 32 \\ \hline 1172 \\ 1758 \\ \hline 18752 \end{array}$$

g.  $7 \overline{)343}$

g. 
$$\begin{array}{r} 49 \\ 7 \overline{)343} \\ \underline{28} \phantom{00} \\ 63 \\ \underline{63} \\ 0 \end{array}$$


h.  $4395 \div 63$

h. 
$$\begin{array}{r} 69 \text{ R}48 \\ 63 \overline{)4395} \\ \underline{378} \phantom{00} \\ 615 \\ \underline{567} \\ 48 \end{array}$$

Use a calculator in Questions 10-12.

10. a. What is the total cost of the skateboard?

- b. How much change is left from \$200?

	
Deck .....	\$88
Trucks .....	\$34
Wheels .....	\$42
Bearings and tape .....	\$8

10. a.

Key Press	Display
8 8	88
+ 4 2	42
+ 3 4	34
+ 8	8
=	172

The total cost is \$172.

- b.

Key Press	Display
2 0 0	200
- 1 7 2	172
=	28

There is \$28 left.



11. Gloria's heart beats an average of 69 times in one minute. How many times does it beat in one hour?



11.  $1\text{h} = 60\text{ min}$

Key Press	Display
6 9	69
$\times$ 60	60
=	4140

Gloria's heart beats 4140 times in 1h.

12. The Petersons travelled 570 km in 6 hours on the first day of their vacation. Find the distance travelled in one hour.



Key Press	Display
5 7 0	570
$\div$ 6	6
=	95

The Petersons travelled 95 km in one hour.

### Guiding the Student

After checking the answers, compare the student's results in the Pretest and the section in which the skill will be with the following chart. (The chart lists the skills covered taught.)

Question	Skill	Section
1, 2, 3	Reading and writing whole numbers	2
4	Comparing and ordering whole numbers	3
5, 6	Rounding whole numbers	4
7a, 7b	Estimating sums	5
7c, 7d	Estimating differences	6
7e, 7f	Estimating products	7
7g, 7h	Estimating quotients	8
8s, 9a, 9b, 10a	Finding sums of whole numbers	9
8b, 9b, 9d, 10b	Finding differences of whole numbers	10
8c, 9c, 9f, 11	Finding products of whole numbers	11
8d, 9g, 9h, 12	Finding quotients of whole numbers	12

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student

experienced difficulties and only the concluding activities in sections which correspond to the questions with which the student experienced success.

## READING AND WRITING WHOLE NUMBERS

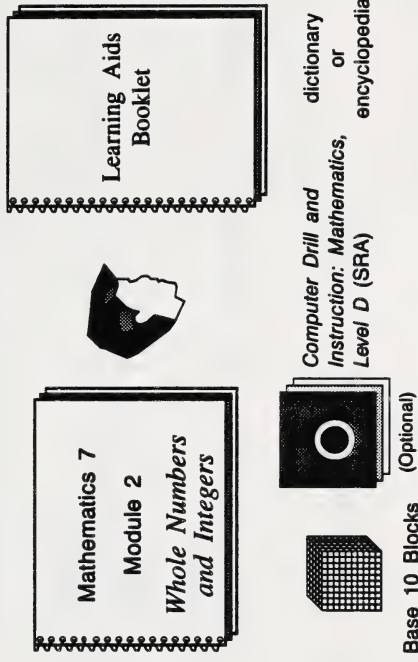
### What Lies Ahead

In this section the student will learn these skills.

- identifying place value in whole numbers
- reading and writing whole numbers in standard form
- writing whole numbers in expanded form
- reading and writing whole numbers in words

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" of Section 2 of the module booklet.
- Next have the student do the Learning Aids Activities (Exercise A in the *Learning Aids Booklet*) and check the answers. Suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 2 in the module booklet and read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.



**Practice Activities****Suggested Answers****Computer Alternative**

1. Do Lessons 1, 3, 4 of the disk "Numbers and Numeration" from the package, *Computer Drill and Instruction: Mathematics, Level D (SRA)*.

1. Computer checked.

Read the instructions in the folder with the disk before using the program. If you need help, remember to hold down the SHIFT key and press the **[?]** key.

**Print Alternative**

2. Express in standard form.

a.  $60\,000 + 8\,000 + 500 + 30 + 4$

2. a. 68 534

b.  $900\,000 + 50\,000 + 6\,000 + 300 + 2$

b. 956 302

c.  $(5 \times 100\,000) + (3 \times 10\,000) + (7 \times 1\,000) + (9 \times 100) + (2 \times 10)$

c. 537 920

d.  $(9 \times 1\,000\,000) + (8 \times 100\,000) + (5 \times 10\,000) + (4 \times 1\,000)$

d. 9 854 000

e.  $(7 \times 100\,000) + (6 \times 10\,000) + (3 \times 1\,000) + (6 \times 100) + (1 \times 10)$

e. 760 306

3. Express in expanded form.

a. 98 100

3. a.  $(9 \times 10) + (8 \times 1000) + (1 \times 100)$

b. 50 543

b.  $(5 \times 10\,000) + (5 \times 100) + (4 \times 10) + (3 \times 1)$

c. 73 725

c.  $(7 \times 10\,000) + (3 \times 1000) + (7 \times 100) + (2 \times 10) + (5 \times 1)$

d. 3 140 000

d.  $(3 \times 1\,000\,000) + (1 \times 100\,000) + (4 \times 10\,000)$

e. 80 500 000

e.  $(8 \times 10\,000\,000) + (5 \times 100\,000)$

4. Write in word form.

a. 98 100

4. a. Ninety-eight thousand one hundred

b. 6853

b. Six thousand eight hundred fifty-three

c. 7062

c. Seven thousand sixty-two

5. Write in standard form.

- a. seventy-five thousand one
5. a. 75 001
- b. six thousand seventy-five
- b. 6 075
- c. one million eight hundred five
- c. 1 000 805

Mathematics 7

Student Support Guide

Guiding the Student

• Have the student do the Concluding Activities. A dictionary or encyclopedia may be helpful.

• Afterward help the student check the answers and correct any errors. Suggested answers are on the following page.

Note

It is expected that the student may have some difficulties with the Concluding Activities. This will not affect the student's progress. These activities are designed to extend or enrich the ideas presented in this section.



## Concluding Activities

Do you like big numbers? The chart below shows the names of the periods of a very large number.

decillions	nonillions	octillions	septillions	sextrillions	quintillions	quadrillions	trillions	billions	millions	thousands	units
123	456	789	012	345	678	901	234	567	890	123	456

Do some research to answer the following.

1. Tell or guess where the names of the periods came from?

## Suggested Answers

1. Beginning with millions, all the names end in -illions.

The prefixes used with this ending have special meanings.

- milli- means 1000
- bi- means 2
- tri- means 3
- quad- means 4
- quint- means 5
- sext- means 6
- sept- means 7
- oct- means 8
- non- means 9
- deci- means 10

Knowing the meaning of the prefixes, it is easy to guess where the names came from. For example:

thousands  
↓

- 1 million (1 000 000) has 1 group of zeros in the thousands period.

thousands  
↓

- 1 billion (1 000 000 000) has 2 groups of zeros: one group in the thousands period and one group in the period to the left.

thousands  
↓

- 1 trillion (1 000 000 000 000) has 3 groups of zeros: one group in the thousands period and the other groups in the periods to the left.

2. Is a billion the same amount in England as in Canada?
  2. A billion in Canada is 1 000 000 000. A billion in England is 1 000 000 000 000. A billion is bigger in England.
  3. Decillions might be used in measuring distances in space.
  4. A *zillion* is a slang expression for a very big number.

## COMPARING AND ORDERING WHOLE NUMBERS

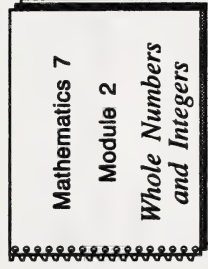
### What Lies Ahead

In this section the student will learn these skills.

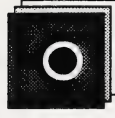
- comparing whole numbers
- ordering whole numbers

### Gathering Materials

For this section the student will need these items.



(Optional)



(Optional)

*Math Works: Place Value*   *Computer Drill and Instruction: of Large Numbers (AIT)*   *Mathematics, Level D (SRA)*

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 3 of the module booklet. The student can view the video or continue reading.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.




# Suggested Answers

## Practice Activities

### Computer Alternative

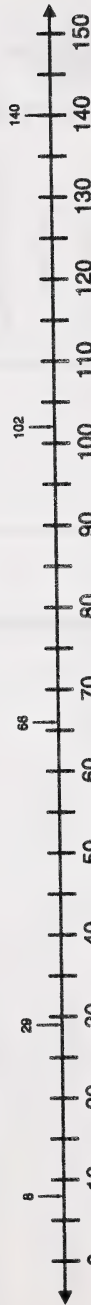
1. If you can use a computer, do Lesson 2 of the "Numbers and Numeration" disk from the package *Computer Drill and Instruction: Mathematics, Level D* (SRA).

Read the instructions in the folder with the disk before using the program. Remember, if you need help or get a question wrong, hold down the SHIFT key and press the  key.

1. Computer corrected

## Print Alternative

2. Place the numbers 8, 29, 66, 102, and 140 on the number line below. The 8 has been placed on the number line as an example.



For Questions 3-4, use the food chart on page 22 of the Module Booklet.

3. Compare the energy content of single servings of these foods using  $<$  or  $>$ .



a. skim milk and 2% milk



b. boiled egg and a boiled potato



c. white bread and whole wheat bread



d. a banana and an apple

4. For breakfast, Hans had single servings of cornflakes, banana, 2% milk, and whole wheat toast with butter. List the energy content of these foods from greatest to least.

5. Arrange from least to greatest.

a. 178, 59, 765, 384, 43

b. 623, 528, 856, 365, 563

c. 929, 299, 292, 229, 922

3. a.  $360 < 540$

b.  $330 < 380$

c.  $340 > 300$

d.  $420 > 290$

4. 540, 420, 300, 245

5. a. 43, 59, 178, 384, 765

b. 365, 528, 563, 623, 856

c. 229, 292, 299, 922, 929

6. Order all the numbers from greatest to least.
- 55 082

54 658

58 901

59 652

52 662

50 657

35 007

56 062

59 182

51 908

57 954

54 366
6. 35 007, 50 657, 51 908, 52 662, 54 366, 54 658, 55 082, 56 062, 57 954, 58 901, 59 182, 59 652,

7. Ontario, Saskatchewan, Alberta, Quebec, Manitoba, British Columbia, Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland

7. The chart below shows the number of farms in each province in 1986. Order the provinces from the greatest number of farms to the least number of farms.

	Number of Farms
Newfoundland	651
Prince Edward Island	2 833
Nova Scotia	4 283
New Brunswick	3 554
Quebec	41 448
Ontario	72 713
Manitoba	27 336
Saskatchewan	63 431
Alberta	57 777
British Columbia	19 063

1

Guiding the Student

• Have the student do the Concluding Activities.

• Afterwards help the student check the answers and correct any errors. Emphasize the process not the answers.

**Concluding Activities**

1. Compare the serial numbers on two or more five-dollar bills. Tell which was printed first.



2. Counting numbers are arranged in four columns as shown. Under which letter will the number 101 appear?

A	B	C	D
1	2	3	4
8	7	6	5
9	10	11	12
16	15	14	13

1

**Suggested Answers**

1. Answers will vary.

2. 101 is in Column D.

\*Alberta Education for the excerpt from *Problem Solving Challenge for Mathematics*, Edmonton, 1985.



3. Rob has 3 dogs. the largest dog is 3 kg heavier than the medium-size dog. The medium-size dog is 4 kg heavier than the smallest dog. Together the three dogs have a mass of 29 kg. What is the mass of each dog?



3. Use guess-check-revise methods.

Guess #1	4
	8
	11
	<hr/>
	23 ← too small

Guess #2	5
	9
	12
	<hr/>
	26 ← too small

Guess #3	6
	10
	13
	<hr/>
	29 ✓

The dogs weigh 6 kg, 10 kg, and 13 kg.

## ROUNDING WHOLE NUMBERS

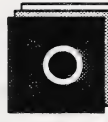
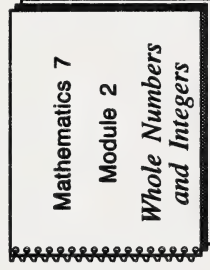
### What Lies Ahead

In this section the student will learn these skills.

- rounding whole numbers
- identifying rounded and exact numbers

### Gathering Materials

For this section the student will need these items.



*Computer Drill and Instruction: Mathematics,  
Level D (SRA)*

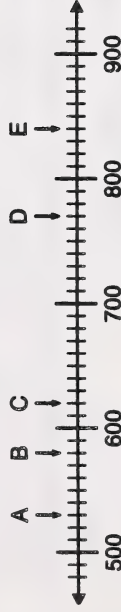
(Optional)

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 4 of the module booklet.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

## Practice Activities

1. Answer true (T) or false (F).



- The number for A is closer to 500 than to 600.
- The number for B is closer to 500 than 600.
- The number for C is closer to 600 than 700.
- The number for D is closer to 700 than 800.
- The number for E is closer to 800 than 900.

2. The number in the middle is closer to one of the outside numbers than the other. Tell which number it is closer to. One has been done for you as an example.

- 30, 32, 40
- 80, 85, 90
- 200, 219, 300
- 600, 651, 700
- 30 000, 37 215, 40 000
- 900 000, 968 200, 1 000 000

## Suggested Answers

- True
  - False
  - True
  - False
  - True
- 30
  - 90
  - 200
  - 700
  - 40 000
  - 1 000 000

**Computer Alternative**

3. Computer checked.

3. If you can use a computer, do Lessons 6, 7, and 8 of the disk "Numbers and Numeration" from the package *Computer Drill and Instruction: Mathematics, Level D* (SRA).

Read the instructions in the folder with the disk before you use the program. If you need help or get a question wrong, hold down the SHIFT key and press the  key.

**Print Alternative**

4. Round to the nearest thousand.

- a. 6071
- b. 5982
- a. 6000
- b. 6000

5. Round to the nearest hundred thousand.

- a. 784 300
- b. 452 121
- a. 800 000
- b. 500 000

6. Round to the nearest ten million.

- a. 9 825 850
- b. 120 980 000
- a. 10 000 000
- b. 120 000 000



7. The following chart shows the number of tourist visits to Canada. Round each number in the chart to these places.

- the nearest ten thousand
- the nearest hundred thousand

Tourist Visits to Canada	rounded to nearest ten thousand	rounded to nearest hundred thousand
United States 12 499 000	12 500 000	12 500 000
Europe 892 322	890 000	900 000
Asia 196 439	200 000	200 000
Caribbean 110 721	110 000	100 000
Australasia 55 508	60 000	100 000
South America 46 370	50 000	0
Africa 26 196	30 000	0

1

### Guiding the Student

- Have students do the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors. Suggested answers are on the next page.

## Concluding Activities



Jack and his father are shopping. His father has a limited amount of money which he cannot overspend. He has no calculator, so he is rounding prices and adding as he goes along. Jack's father rounds every price to the highest dollar, even if the price is closer to the lowest dollar (e.g. \$2.29  $\neq$  \$3.00, instead of \$2.00).

1. Why do you think Jack's father always rounds up? What is the advantage of this method?
2. What is the disadvantage of this method?

## Suggested Answers

1. Jack's father does not want to overspend. If he rounds up, the rounded number is always more than the exact number. This makes him more cautious while he shops.
2. The rounded number is much more than the exact number. Always rounding up is never very accurate.



## ESTIMATING SUMS

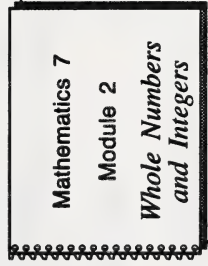
### What Lies Ahead

In this section the student will learn these skills.

- deciding when to make estimates
- estimating whole number sums

### Gathering Materials

For this section the student will need these items.



*Math Works: Place Value of Large Numbers*  
(AIT)  
(Optional)

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" of Section 5 of the module booklet. The student can view the video program or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.



**Practice Activities**

Do either Question 1 or 2.

1. If you watched the video, answer the following questions about the video, "Using Estimating ad Approximating."

- a. Describe two situations in the story in which approximate numbers were used.
- b. Name two things that Vickie and David measured by estimating.
- c. At the hardware store, why did Grandma, Vickie, and David decide to go back home and measure the attic?

If you did not watch the video, do the following.

2. A newspaper headline reads "25 000 Attend Playoff Game". Is an estimate sufficient in these situations?

- a. the accountant figures out how much money was made on ticket sales?
- b. the newspaper reports the number of people who attended the game?

**Suggested Answers**

1. a. See video.  
b. See video.  
c. See video.

2. a. The accountant must know the exact number of ticket sales to verify the amount of money received.  
b. The newspaper reports an estimate number. People are interested in knowing only the approximate number of people that attend a game.

3. Tell whether the number is exact or approximate.

- a. A hockey player scored 92 goals in one season.

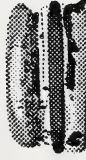


3. a. exact

- b. The apartment rent is \$356 per month.

b. exact

- c. Fifty-five million hamburgers have been sold.



c. approximate

- d. The town has a population of 4000.

d. approximate

- e. The Wolds live 172 km from Edmonton.



e. approximate

4. Tell the number of digits in the sums.

a.  $38 + 46$

4. a. 2

b.  $825 + 36$

b. 3

c.  $1284 + 32$

c. 4

d.  $356 + 248$

d. 3

5. Estimate the sums.

a.  $62 + 27$

b. 
$$\begin{array}{r} 635 \\ + 7049 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 921 \\ 367 \\ 405 \\ + 883 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 35\,679\,002 \\ + 29\,941\,750 \\ \hline \end{array}$$

Note: Any reasonable estimate is acceptable in Questions 5-7.

5. a.  $60 + 30 \approx 90$

Rounding

Front-end digits


$60 + 20 \approx 80$

b. 
$$\begin{array}{r} 600 \\ + 7000 \\ \hline 7600 \end{array}$$


c. 
$$\begin{array}{r} 900 \\ 400 \\ 400 \\ + 900 \\ \hline 2600 \end{array}$$

d. 
$$\begin{array}{r} 30\,000\,000 \\ + 30\,000\,000 \\ \hline 60\,000\,000 \end{array}$$

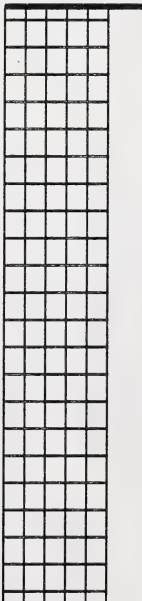
6. Estimate the cost of the badminton equipment.



badminton racket ... \$42



bird ... \$16



net ... \$37

6. Using rounding:  $\$40 + \$20 + \$40 \approx \$100$

Using front-end digits:  $\$40 + \$10 + \$30 \approx \$80$

7. Use the chart below. Estimate the total number of farms.

Number of Farms	
Newfoundland	651
Prince Edward Island	2 833
Nova Scotia	4 283
New Brunswick	3 554
Quebec	41 448
Ontario	72 713
Manitoba	27 336
Saskatchewan	63 431
Alberta	57 777
British Columbia	19 063

7. Using rounding:

1 000  
3 000  
4 000  
4 000  
41 000  
73 000  
27 000  
63 000  
58 000  
19 000  
293 000

Using front-end digits:

600  
2 000  
4 000  
3 000  
40 000  
70 000  
20 000  
60 000  
50 000  
10 000  
259 600

### Guiding the Student

- If the student had difficulties, assign the Extra Practice Activities.
- If the student had success, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.



**Extra Practice****Suggested Answers**

1. Estimate the sums. Fill in the letter of the line to which each sum belongs. One has been done as an example.

a.  $200 + 840$

b.  $654 + 87$

c.  $982 + 1025$

d.  $146 + 283$

e.  $845 + 4525$

f.  $96 + 1025$

g.  $999 + 3$

h.  $2042 + 4650$



1

2. In each case, tell if an exact number would be needed, or if an estimate would be good enough.

- a. You want to calculate pay cheques. 2. a. exact
- b. You want to figure out the number of hot dogs needed for a picnic. b. estimate



- c. You want to find the distance to be travelled on a vacation trip. c. estimate
- d. You want to find a medicine dosage. d. exact



### Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Concluding Activities**

1. Circle the most accurate estimate from the choices given at the right.

a.  $83 + 49$

b.  $152 + 108$

c.  $32\,460 + 5\,666$

d. 
$$\begin{array}{r} 819 \\ 273 \\ + 590 \\ \hline \end{array}$$

2. Estimate the sums of the following. Predict whether the exact sum will be more or less than the estimate.

a.  $711 + 623$

b. 
$$\begin{array}{r} 6470 \\ + 2830 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 78\,420 \\ + 56\,311 \\ \hline \end{array}$$

**Suggested Answers**

1. a. 80, 100, 130, 150

b. 150, 100, 250, 300

c. 32 000, 35 000, 38 000, 40 000

d. 1600, 1700, 1800, 2000

2. a. 
$$\begin{array}{r} 700 \\ + 600 \\ \hline 1300 \end{array}$$

The sum will be more than the estimate.

b. 
$$\begin{array}{r} 6000 \\ + 3000 \\ \hline 9000 \end{array}$$

The sum will be more than the estimate.

c. 
$$\begin{array}{r} 80\,000 \\ + 60\,000 \\ \hline 140\,000 \end{array}$$

The sum will be less than the estimate.

## ESTIMATING DIFFERENCES

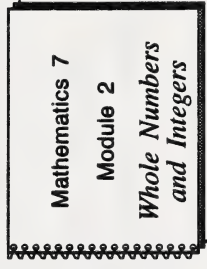
### What Lies Ahead

In this section the student will learn these skills.

- estimating whole number differences
- determining whether a calculated difference is reasonable, or whether an error was made

### Gathering Materials

For this section the student will need this item.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 6 of the module booklet.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.



**Practice Activities**

1. Circle the most accurate estimate from the choices given at the right.

a.  $85 - 48$

b.  $693 - 485$

c.  $53\,240 - 14\,881$

d. 
$$\begin{array}{r} 65\,523\,700 \\ - 8\,250\,194 \\ \hline \end{array}$$

2. Tell whether the difference will be more or less than 500.

a. 
$$\begin{array}{r} 630 \\ - 185 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 741 \\ - 369 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 309\,477 \\ - 308\,995 \\ \hline \end{array}$$

d.  $5789 - 5190$

**Suggested Answers**

1. a.  $50$ , 60, 70, 100

b. 100, 150,  $200$ , 300

c.  $38\,000$ , 39 000, 40 000, 45 000

d. 55 000 000, 57 000 000,  $58\,000\,000$ , 60 000 000

2. a. less

b. less

c. less

d. more

3. Estimate the difference and predict whether the exact difference will be more or less than the estimate.

$$\begin{array}{r} \text{a.} \quad 326 \\ - 189 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 741 \\ - 369 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 309\,477 \\ - 308\,995 \\ \hline \end{array}$$

$$\text{d.} \quad 607 - 339$$

$$\text{e.} \quad 41\,777 - 28\,666$$

4. If 376 out of 2145 employees of an airline are pilots, estimate the number of employees who are not pilots.



In Questions 3-5 accept a range of estimates.

Using rounding:                      Using front-end digits:

3. a.  $300 - 200 \pm 100$  (more)       $300 - 100 \pm 200$  (less)

b.  $700 - 400 \pm 300$  (more)       $700 - 300 \pm 400$  (less)

c.  $309\,000 - 308\,000 \pm 1000$        $300\,000 - 300\,000 = 0$   
(less)                                      (more)

d.  $600 - 300 \pm 300$  (less)       $600 - 300 \pm 300$  (less)

e.  $42\,000 - 29\,000 \pm 13\,000$        $40\,000 - 20\,000 \pm 20\,000$   
(more)                                      (less)

4. Using rounding:  $2100 - 400 \pm 1700$ .

Using front-end digits:  $2000 - 300 \pm 1700$ .

About 1700 of the employees are not pilots.

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Activities.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Extra Practice**

1. Estimate the differences.

$$\begin{array}{r} \text{a.} \quad 91 \\ - 47 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 246 \\ - 85 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 5174808 \\ - 2606283 \\ \hline \end{array}$$

$$\text{d.} \quad 510 - 136$$

$$\text{e.} \quad 4491 - 912$$

2. In Canada 15 334 000 people have English for their mother tongue, while 6 160 000 have French. Estimate how many more people have English for a mother tongue.

**Suggested Answers**

Using rounding:

$$\begin{array}{r} \text{1. a.} \quad 90 \\ - 50 \\ \hline 40 \end{array}$$

$$\begin{array}{r} \text{b.} \quad 250 \\ - 90 \\ \hline 160 \end{array}$$

$$\begin{array}{r} \text{c.} \quad 5200000 \\ - 2600000 \\ \hline 2600000 \end{array}$$

$$\begin{array}{r} \text{d.} \quad 500 \\ - 100 \\ \hline 400 \end{array}$$

$$\begin{array}{r} \text{e.} \quad 4500 \\ - 900 \\ \hline 3600 \end{array}$$

Using front-end digits:

$$\begin{array}{r} 90 \\ - 40 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 200 \\ - 80 \\ \hline 120 \end{array}$$

$$\begin{array}{r} 5000000 \\ - 2000000 \\ \hline 3000000 \end{array}$$

$$\begin{array}{r} 500 \\ - 100 \\ \hline 400 \end{array}$$

$$\begin{array}{r} 4000 \\ - 900 \\ \hline 3100 \end{array}$$

2. Using rounding:

$$\begin{array}{r} 15000000 \\ - 6000000 \\ \hline 9000000 \end{array}$$

Using front-end digits:

$$\begin{array}{r} 15000000 \\ - 6000000 \\ \hline 9000000 \end{array}$$

The number of people in Canada with English for a mother tongue is about 9 000 000.

**Concluding Activities**

1. Just by estimating, tell which answers cannot be correct.

a. 
$$\begin{array}{r} 885 \\ - 497 \\ \hline 588 \end{array}$$

b.  $9450 - 4888 = 4562$

c.  $15784 - 10631 = 5153$

d. 
$$\begin{array}{r} 169\,000\,500 \\ - 24\,500\,000 \\ \hline 134\,500\,500 \end{array}$$

**Suggested Answers**

Rounding:

1. a. 
$$\begin{array}{r} 900 \\ - 500 \\ \hline 400 \end{array}$$

b. 
$$\begin{array}{r} 9000 \\ - 5000 \\ \hline 4000 \end{array}$$

c. 
$$\begin{array}{r} 16\,000 \\ - 11\,000 \\ \hline 5\,000 \end{array}$$

d. 
$$\begin{array}{r} 170\,000\,000 \\ - 20\,000\,000 \\ \hline 150\,000\,000 \end{array}$$

Front-end digits:

$$\begin{array}{r} 800 \\ - 400 \\ \hline 400 \end{array}$$

$$\begin{array}{r} 9000 \\ - 4000 \\ \hline 5000 \end{array}$$

$$\begin{array}{r} 15\,000 \\ - 10\,000 \\ \hline 5\,000 \end{array}$$

$$\begin{array}{r} 160\,000\,000 \\ - 20\,000\,000 \\ \hline 140\,000\,000 \end{array}$$

The answers which are not correct are a. and d.

2. a. 388

b. 4562

c. 5153

d. 144 500 500

2. Check the answers to Question 1 with a calculator.





## ESTIMATING PRODUCTS

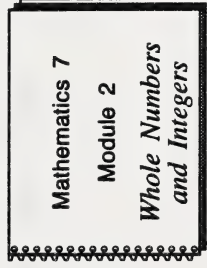
### What Lies Ahead

In this section the student will learn these skills.

- estimating whole number products
- determining if a calculated product is reasonable, or whether an error was made

### Gathering Materials

For this section the student will need these items.



(Optional)

*Solve It: Strategies for Multiplication*



(Optional)

Disk A (MAC 6) "Multi Targets"

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 7 of the module booklet. The student can view the video or continue reading.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Practice Activities**

Do Question 1 or 2.

1. If you watched the video program do the following.

- Name two estimations made by the boys.
- Describe the three estimation strategies by the boys.
- Why did the boys use estimations rather than exact calculations?

- a. See video.
- b. See video.
- c. See video.

2. If you did not watch the video, give examples in everyday life when an exact product is needed and when an estimated product is sufficient.

2. Answers may vary.

3. How many digits will be in the product?

- $230 \times 3$
- $18 \times 26$
- $1850 \times 49$
- $786 \times 952$

- a. 3
- b. 3
- c. 5
- d. 6

**Suggested Answers**

4. Circle the most accurate estimate listed at the right. Then predict whether the actual product will be more or less.

a.  $62 \times 29$

b.  $19 \times 73$

c.  $52 \times 49$

4. a. 1200, 1400, 1800, 2100 The product is less.

b. 700, 800, 1400, 1600 The product is less.

c. 2000, 2400, 2500, 3000 The product is more.

5. Round the second factor to the nearest ten, hundred, or thousand, to make it easy to multiply. Then multiply mentally to get an estimate. One is done as an example.

a.  $5 \times 874$  is approximately 4500.

b.  $3 \times 57$  is approximately 180.

c.  $6 \times 42$  is approximately 240.

d.  $8 \times 233$  is approximately 1600.

e.  $6 \times 789$  is approximately 4800.

f.  $3 \times 2350$  is approximately 6000.



6. When using “betweenness” to estimate in multiplication, round both up and down to find estimate boundaries. One is done as an example.

a.  $8 \times 542$  is between 4000 and 4800.

b.  $4 \times 429$  is between 1600 and 1600.

c.  $7 \times 3840$  is between 21 000 and 28 000.

d.  $3 \times 256$  is between 600 and 900.

e.  $2 \times 850$  is between 1600 and 1800.

7. Estimate by multiplying front digits and using place value to put on the correct number of zeros. One is done as an example.

a.  $34 \times 219$  is approximately 6000.

b.  $310 \times 220$  is approximately 60 000.

c.  $72 \times 53214$  is approximately 3 500 000.

d.  $68 \times 341$  is approximately 18 000.

e.  $524 \times 415$  is approximately 200 000.

8. According to a map of the river, marker buoys are 450 m apart. If the boys need to paddle their canoe past 7 more buoys before they arrive at the waterfall, about how far is it to the waterfall? Give upper and lower estimate boundaries.



9. On the map, the distance from Seneca Falls to the fork of the White River is 228 mm. Each mm on the map represents 80 m of actual distance. About how many meters is it from Seneca Falls to the White River?

$$9. \quad 200 \times 80 = 16\,000 \text{ m}$$

The distance from Seneca Falls to the fork of the White River is about 16 000 m.

### Guiding the Student

- Have the student correct any errors.
- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Extra Practice****Suggested Answers**

Estimate the products. Fill in the letter of the line to which each product belongs. One has been done as an example.



- |                   |                    |                    |
|-------------------|--------------------|--------------------|
| 1. $9 \times 8$   | 5. $45 \times 33$  | 9. $14 \times 8$   |
| 2. $25 \times 12$ | 6. $18 \times 72$  | 10. $32 \times 61$ |
| 3. $51 \times 12$ | 7. $35 \times 16$  | 11. $87 \times 8$  |
| 4. $21 \times 40$ | 8. $105 \times 12$ | 12. $54 \times 23$ |

- |      |      |       |
|------|------|-------|
| 1. A | 5. C | 9. A  |
| 2. A | 6. C | 10. D |
| 3. B | 7. B | 11. B |
| 4. B | 8. C | 12. C |

1

**Guiding the Student**

- Next have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

## Concluding Activities

### Computer Alternative

1. Do the program, "Multi Targets" on Disk A of MAC 6. Information on the program is in the folder with the disk.

### Print Alternative

2. a. Place the numbers 1, 2, 3, 4, and 5 in the boxes to make the largest possible product and the smallest possible product. (Use your calculator to help you decide.)

Largest Possible Product

$$\begin{array}{r} 4 \\ \times 5 \\ \hline 20 \end{array}$$

Smallest Possible Product

$$\begin{array}{r} 2 \\ \times 1 \\ \hline 2 \end{array}$$

- b. Now try these numbers: 5, 2, 4, 6, 0.

$$\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 4 \\ \times 2 \\ \hline 8 \end{array}$$

- c. Now try these numbers: 8, 9, 0, 4, 3.

$$\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$$

## Suggested Answers

1. Computer-checked



- d. Now try these numbers: 6, 2, 4, 3, 8.

	Largest Possible Product		Smallest Possible Product
d.	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">6</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">4</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">2</div>		<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">3</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">6</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">8</div>
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">×</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">8</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">3</div>		<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">×</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">2</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">4</div>

- e. Now try these numbers: 2, 7, 6, 1, 8.

e.	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">7</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">6</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">1</div>	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">2</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">7</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">8</div>
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">×</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">8</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">2</div>	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">×</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">1</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">6</div>

- f. Did you discover a pattern for the largest product? the smallest product? What is the pattern?

- f. Arrange the digits in order from largest to smallest. For largest product the largest digit goes where the 5 is, the next largest where the 4 is, the next largest where the 3 is, the next largest where the 2 is, and the next largest where the 1 is.

$$\begin{array}{r} 421 \\ \times 53 \\ \hline \end{array}$$

For the smallest product, the largest digit goes where the 1 is, the next largest where the 2 is, the next largest where the 3 is, and next largest where the 4 is, and the next largest where the 5 is.

$$\begin{array}{r} 235 \\ \times 14 \\ \hline \end{array}$$

<sup>1</sup>National Council of Teachers of Mathematics for excerpts from *The Arithmetic Teacher*, Reston, Virginia, October, 1987.

## ESTIMATING QUOTIENTS

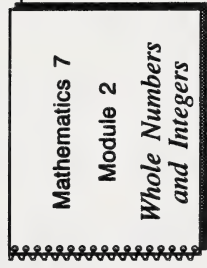
### What Lies Ahead

In this section the student will learn these skills.

- estimating whole number quotients
- determining if calculated whole number quotients are reasonable, or whether an error was made

### Gathering Materials

For this section the student will need these items.



(Optional)



(Optional)

Solve It: Estimations  
Strategies for Division (AIT) Disk A (MAC 6) "Tug of War"

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 8 of the module booklet. The student can view the video or continue reading.

- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

# Suggested Answers

## Practice Activities

Do Question 1 or 2.

1. a. In the video, you were introduced to a manager of a sports stadium. Name two ways in which the manager uses estimation in his daily work.  
b. Describe how Pete estimates the number of chocolate bars he and Benny must sell per hour.

2. If you did not watch the video, describe situations in everyday life in which you might estimate quotients.

3. How many digits will be in the quotients?

a.  $832 \div 41$

b.  $6178 \div 52$

c.  $1500 \div 21$

d.  $38725 \div 95$

e.  $43872 \div 38$

1. a. See video.

- b. See video.

2. Answers may vary.

3. a. 2

- b. 3

- c. 2

- d. 3

- e. 4

4. Circle the best estimate from the choices given at the right.

a.  $268 \div 3$

4. a. 8, 80, 800, 8000

b.  $500 \div 21$

b. 2, 20, 200, 2000

c.  $763 \div 11$

c. 7, 70, 700, 7000

d.  $387 \div 97$

d. 4, 40, 400, 4000

5. Circle the front digits of the divisor and dividend you will use to estimate. Then write the estimate. One is done as an example.

a. 46 52  $\div$  5 3

5. a. 46 52  $\div$  5 3 Estimate: 90

b.  $71\,345 \div 21$

b. 7 1345  $\div$  2 1 Estimate: 3000 or 3500

c.  $6189 \div 32$

c. 6 189  $\div$  3 2 Estimate: 200

d.  $65\,102 \div 81$

a. 65 102  $\div$  8 1 Estimate: 800

e.  $2685 \div 32$

e. 26 85  $\div$  3 2 Estimate: 80

6. Write a related division problem using friendly numbers. Use it to give an estimate. One is done as an example.

- a.  $268 \div 3$
- b.  $200 \div 7$
- c.  $7150 \div 9$
- d.  $137 \div 12$
- e.  $152 \div 40$

- 6. a.  $270 \div 3 \approx 90$
- b.  $210 \div 7 \approx 30$
- c.  $7200 \div 9 \approx 800$
- d.  $120 \div 12 \approx 10$
- e.  $160 \div 40 \approx 4$

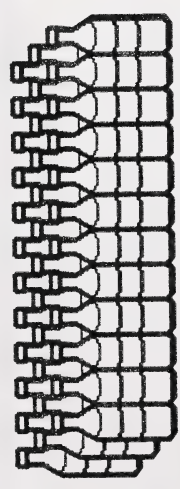
7. In a month 26 teenagers collected 1386 bottles for recycling. Estimate the number of bottles collected by each teenager.

7. Any reasonable estimate is acceptable. These use friendly numbers.

$$1500 \div 30 \approx 50$$

$$1400 \div 20 \approx 70$$

Each teenager collects between 50 and 70 bottles.



### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.
- If the student had success with the Practice Activities, assign the Concluding Activities.



**Extra Practice**

1. Predict the number of digits in the quotient.

- a.  $498 \div 30$
- b.  $1116 \div 80$
- c.  $41623 \div 50$
- d.  $53821 \div 25$
- e.  $498 \div 57$

2. Circle the most accurate estimate from the choices given at the right.

a.  $53 \overline{) 2009}$

b.  $24 \overline{) 10247}$

c.  $42 \overline{) 12875}$

3. Are the quotients reasonable?

- a.  $512 \div 8 = 64$
- b.  $7264 \div 33 = 121$
- c.  $68085 \div 765 = 89$
- d.  $35636 \div 59 = 6040$

**Suggested Answers**

1. a. 2  
b. 2  
c. 3  
d. 4  
e. 1

2. a. 4, 40, 400, 4000  
b. 40, 50, 400, 500  
c. 3, 30, 300, 3000

3. a. Yes  
b. No  
c. Yes  
d. No

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Concluding Activities****Computer Alternative**

1. If you have a computer, do the program "Tug of War" on Disk A of MAC 6. Information on the program is in the folder with the disk.

**Print Alternative**

2. a. Put the numbers 1, 2, 3, 4, and 5 into the boxes at the right and make the largest possible quotient and the smallest possible quotient. (Use your calculator to help you decide.)
- b. Now try these numbers: 2, 4, 6, 8, 0.
- c. Now try these numbers: 8, 9, 0, 4, 3.
- d. Did you discover a pattern for the largest quotient and the smallest quotient? What is the pattern for each quotient?

**Suggested Answers**

1. Computer-checked

2. a. 
$$\begin{array}{r} \boxed{1} \boxed{2} \overline{) \boxed{5} \boxed{4} \boxed{3}} \\ \underline{\phantom{00}00} \phantom{00} \\ \phantom{00}00 \phantom{00} \end{array}$$
      
$$\begin{array}{r} \boxed{5} \boxed{4} \overline{) \boxed{1} \boxed{2} \boxed{3}} \\ \underline{\phantom{00}00} \phantom{00} \\ \phantom{00}00 \phantom{00} \end{array}$$

b. 
$$\begin{array}{r} \boxed{2} \boxed{0} \overline{) \boxed{8} \boxed{6} \boxed{4}} \\ \underline{\phantom{00}00} \phantom{00} \\ \phantom{00}00 \phantom{00} \end{array}$$

c. 
$$\begin{array}{r} \boxed{3} \boxed{0} \overline{) \boxed{9} \boxed{8} \boxed{4}} \\ \underline{\phantom{00}00} \phantom{00} \\ \phantom{00}00 \phantom{00} \end{array}$$

- d. To obtain the largest quotient divide the largest possible number by the smallest possible.

To obtain the smallest quotient divide the smallest possible number by the largest possible number.

## FINDING SUMS

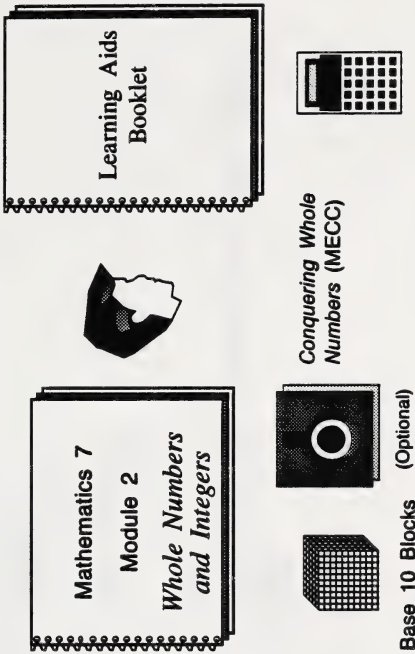
### What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number sums
- checking the accuracy of whole number sums

### Gathering Materials

For this section the student will need these items.






### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 9 of the module booklet.
- Next have the student do the Learning Aids Activities (Exercise B in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 9 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities****Suggested Answers**

Do Questions 1-3 without a calculator.

1. Linda observed weather conditions. How many days did she observe?

		
rainy	cloudy	sunny
9d	20d	12d

1. Linda observed weather conditions for  $9d + 20d + 12d = 41d$ .

2. Find the sums.

a.  $2748 + 345 + 506$

2. a. 3599

b.  $928 + 542 + 140$

b. 1610

c.  $8075 + 430$

c. 8505

d.  $999 + 22887$

d. 23 886

e.  $96\,319 + 4284$

e. 100 603

f.  $268\,451 + 917\,449$

f. 1 185 900

3. Fill in the missing digits.

a.

$$\begin{array}{r} \boxed{\phantom{0}} \boxed{4} \boxed{6} \boxed{9} \\ + \boxed{7} \boxed{\phantom{0}} \boxed{2} \boxed{\phantom{0}} \\ \hline 1 \ 0 \ 9 \ \boxed{\phantom{0}} \ 3 \end{array}$$

b.

$$\begin{array}{r} \boxed{\phantom{0}} \boxed{6} \boxed{5} \\ + \boxed{6} \boxed{\phantom{0}} \boxed{8} \\ \hline 9 \ 1 \ \boxed{\phantom{0}} \end{array}$$

a.

$$\begin{array}{r} \boxed{3} \boxed{4} \boxed{6} \boxed{9} \\ + \boxed{7} \boxed{5} \boxed{2} \boxed{4} \\ \hline 1 \ 0 \ 9 \ \boxed{9} \ 3 \end{array}$$

b.

$$\begin{array}{r} \boxed{2} \boxed{6} \boxed{5} \\ + \boxed{6} \boxed{4} \boxed{8} \\ \hline 9 \ 1 \ \boxed{3} \end{array}$$

4. Solve by using a calculator. The chart shows the population of four Alberta cities in 1986.

Population	
Calgary	636 104
Edmonton	573 982
Lethbridge	58 841
Red Deer	54 425

1

Find the total population of the four cities listed in the table.

4. The total population of Alberta's four major cities is 1 323 352.



**Computer Alternative**

5. If you wish to have more instruction and practice in addition, try the computer program *Conquering Whole Numbers* (MECC). Addition is the first lesson. A description of the program and instructions for use are given in the folder with the disk.
5. Computer-checked.

**Guiding the Student**

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

**Concluding Activities**

Do not use a calculator on the following.

1. a. In what year were you born? \_\_\_\_\_  
How many reversals are needed to make a palindrome from your birth year?
- b. Try this with the birth years of other family members and some friends. Who has the most reversals?

**Suggested Answers**

1. Answers will vary.

If the student was born in 1977, 11 reversals would be needed.

$$\begin{array}{r} \text{Step 1.} \quad 1977 \\ + 7791 \\ \hline 9768 \end{array} \qquad \begin{array}{r} \text{Step 2.} \quad 9768 \\ + 8679 \\ \hline 18447 \end{array}$$

$$\begin{array}{r} \text{Step 3.} \quad 18447 \\ + 74481 \\ \hline 92928 \end{array} \qquad \begin{array}{r} \text{Step 4.} \quad 92928 \\ + 82929 \\ \hline 175857 \end{array}$$

$$\begin{array}{r} \text{Step 5.} \quad 175857 \\ + 758571 \\ \hline 934428 \end{array} \qquad \begin{array}{r} \text{Step 6.} \quad 934428 \\ + 824439 \\ \hline 1758867 \end{array}$$

$$\begin{array}{r} \text{Step 7.} \quad 1758867 \\ + 7688571 \\ \hline 9446438 \end{array} \qquad \begin{array}{r} \text{Step 8.} \quad 9446438 \\ + 8446449 \\ \hline 17892887 \end{array}$$

$$\begin{array}{r} \text{Step 9.} \quad 17892887 \\ + 78829871 \\ \hline 95722758 \end{array} \qquad \begin{array}{r} \text{Step 10.} \quad 95722758 \\ + 85722759 \\ \hline 181445517 \end{array}$$

$$\begin{array}{r} \text{Step 11.} \quad 181445517 \\ + 715544181 \\ \hline 896989698 \end{array}$$

2. Below are three sets of digits: 3 fives, 3 ones, and 3 nines. These make a total of nine digits. The object is to cross out six of the digits and leave three so that when added together you have a sum of 20. How can this be done?

5	5	5	1	1	1	9	9	9
								1

2. ~~5~~ ~~5~~ ~~5~~ ~~1~~ ~~1~~ ~~1~~ ~~9~~ ~~9~~ ~~9~~

$$11 + 9 = 20$$

## FINDING DIFFERENCES

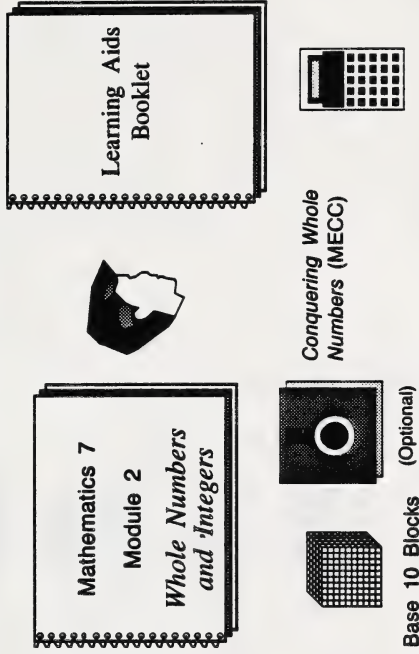
### What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number differences
- checking the accuracy of calculated whole number differences

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 10 of the module booklet.
- Have the student do the Learning Aids Activities (Exercise C in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 10 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities****Suggested Answers**

Do not use a calculator for Questions 1 and 2.

1. Find the difference using paper-and-pencil methods.

a. 
$$\begin{array}{r} 5985 \\ - 3780 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 4384 \\ - 1678 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 885\,312 \\ - 235\,209 \\ \hline \end{array}$$

d.  $2793 - 329$

e. 
$$\begin{array}{r} 50\,000 \\ - 6\,237 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 949\,888 \\ - 796\,902 \\ \hline \end{array}$$

1. a. 
$$\begin{array}{r} 5985 \\ - 3780 \\ \hline 2205 \end{array}$$

b. 
$$\begin{array}{r} 4384 \\ - 1678 \\ \hline 2706 \end{array}$$

c. 
$$\begin{array}{r} 885\,312 \\ - 235\,209 \\ \hline 650\,103 \end{array}$$

d. 
$$\begin{array}{r} 2793 \\ - 329 \\ \hline 2464 \end{array}$$

e. 
$$\begin{array}{r} 50\,000 \\ - 6\,237 \\ \hline 43\,763 \end{array}$$

f. 
$$\begin{array}{r} 949\,888 \\ - 796\,902 \\ \hline 152\,986 \end{array}$$



2. Fill in the missing digits.

a.

$$\begin{array}{r} \boxed{\phantom{0}} \boxed{\phantom{0}} 1 \\ - 3 \boxed{\phantom{0}} \boxed{\phantom{0}} \\ \hline 49 \end{array}$$

b.

$$\begin{array}{r} \boxed{\phantom{0}} 4 6 \\ - 9 \boxed{\phantom{0}} 5 \\ \hline 44 \boxed{\phantom{0}} \end{array}$$

c.

$$\begin{array}{r} \boxed{\phantom{0}} 8 5 1 \boxed{\phantom{0}} \\ - 2 \boxed{\phantom{0}} \boxed{\phantom{0}} 6 1 \\ \hline 354 \boxed{\phantom{0}} 1 \end{array}$$

2. a.

$$\begin{array}{r} \boxed{8} \boxed{\phantom{0}} 1 \\ - 3 \boxed{2} \boxed{\phantom{0}} \\ \hline 49 \end{array}$$

b.

$$\begin{array}{r} \boxed{7} 4 6 \\ - 3 \boxed{0} 5 \\ \hline 44 \boxed{1} \end{array}$$

c.

$$\begin{array}{r} \boxed{5} 8 5 1 \boxed{2} \\ - 2 \boxed{3} \boxed{0} 6 1 \\ \hline 354 \boxed{5} 1 \end{array}$$

Use a calculator for Question 3.

3. The chart shows jam sales.

Jars of Jam Sold		
Kind	January	April
Strawberry	298	305
Raspberry	254	278

a. How many more jars of strawberry jam than raspberry jam were sold in January?

3. a.  $298 - 254 = 44$

44 more jars of strawberry jam were sold in January.

b. How many more jars of strawberry jam were sold in April than in January?

b.  $305 - 298 = 7$

7 more jars of strawberry jam were sold April.

### Computer Alternative

4. For further instruction and practice in subtraction, try the subtraction lesson, which is the second lesson, in the computer program *Conquering Whole Numbers* (MECC). Information on the program is in the folder with the disk.

4. Computer-checked.

### Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

**Concluding Activities**

1. Twelve-year olds require about 10.4 megajoules or 10 400 kilojoules of food energy each day.

Shawn is 12 years old. For dinner, he had the following:

Tomato juice ....	190 kJ	Broccoli .....	90 kJ
Roast beef .....	810 kJ	Strawberries ....	240 kJ
Baked potato ...	380 kJ	Milk, whole .....	660 kJ
Butter .....	450 kJ	2 slices bread .	600 kJ

1

To have eaten the required amount for the day, how much food energy should have been provided by Shawn's other meals?



**Suggested Answers**

1. 
$$\begin{array}{r} 10\,400 \\ - 3\,420 \\ \hline 6\,980 \end{array}$$

Shawn's other meals should have provided 6980 kJ of food energy on this particular day.

2. A pulp and paper company employed 15 003 people. There were 3362 loggers, 1604 office workers, and 5159 maintenance and construction workers. In addition, 772 people worked in the laboratories and 4106 workers processed the paper.

a. How many of the people employed by the company are not loggers?

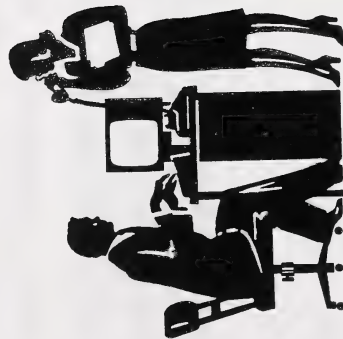
$$\begin{array}{r} 2. \text{ a.} \quad 15\,003 \\ - \quad 3\,362 \\ \hline 11\,641 \end{array}$$

There are 11 641 people working for this company who are not loggers.

b. How many more people work in the office than in the laboratories?

$$\begin{array}{r} \text{b.} \quad 1604 \\ - \quad 772 \\ \hline 832 \end{array}$$

There are 832 more people who work in the offices than those working in laboratories.



c. How many fewer people process the paper than work in maintenance and construction?

c. 
$$\begin{array}{r} 5189 \\ - 4106 \\ \hline 1083 \end{array}$$

There are 1083 fewer people who process paper as compared to maintenance and construction workers.

d. What is the difference of the numbers for the largest group of employees and the smallest group of employees?

d. 
$$\begin{array}{r} 5159 \\ - 772 \\ \hline 4387 \end{array}$$

The difference between the largest group of workers and the smallest group of workers is 4387.





## FINDING PRODUCTS

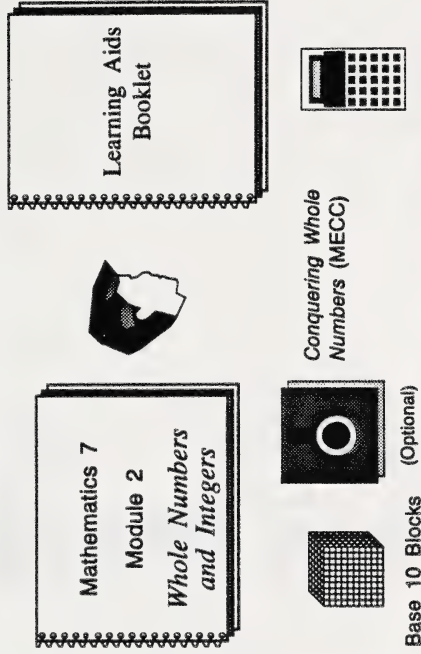
### What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number products in column form
- checking the accuracy of exact whole number products

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 11 of the module booklet.
- Next have the student do the Learning Aids Activities (Exercise D in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 11 in the *Module Booklet*. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities**

Do not use a calculator for Questions 1 and 2.

1. Find the product using paper and pencil methods.

a. 
$$\begin{array}{r} 38 \\ \times 6 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 17 \\ \times 49 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 79 \\ \times 40 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 105 \\ \times 38 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 273 \\ \times 4 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 196 \\ \times 303 \\ \hline \end{array}$$

**Suggested Answers**

1. a. 
$$\begin{array}{r} 38 \\ \times 6 \\ \hline 228 \end{array}$$

b. 
$$\begin{array}{r} 17 \\ \times 49 \\ \hline 153 \\ 68 \phantom{0} \\ \hline 833 \end{array}$$

c. 
$$\begin{array}{r} 79 \\ \times 40 \\ \hline 3160 \end{array}$$

d. 
$$\begin{array}{r} 105 \\ \times 38 \\ \hline 840 \\ 315 \phantom{0} \\ \hline 3990 \end{array}$$

e. 
$$\begin{array}{r} 273 \\ \times 4 \\ \hline 1092 \end{array}$$

f. 
$$\begin{array}{r} 196 \\ \times 303 \\ \hline 588 \\ 5880 \phantom{0} \\ \hline 59388 \end{array}$$

## 2. Complete.

a.

$$\begin{array}{r}
 408 \\
 \times 68 \\
 \hline
 3 \square \square 4 \\
 \square \square \square 4 8 \\
 \hline
 \square \square 7 \square \square 4 4
 \end{array}$$

3. a.

$$\begin{array}{r}
 408 \\
 \times 68 \\
 \hline
 3 \square \square 4 \\
 \square \square \square 4 8 \\
 \hline
 \square \square 7 \square \square 4 4
 \end{array}$$

b.

$$\begin{array}{r}
 93 \\
 \times \square \square 6 \\
 \hline
 \square \square \square 5 \square \\
 \square \square 7 9 \\
 \hline
 \square \square 3 \square \square 8
 \end{array}$$

b.

$$\begin{array}{r}
 93 \\
 \times \square \square 6 \\
 \hline
 \square \square \square 5 \square \\
 \square \square 7 9 \\
 \hline
 \square \square 3 \square \square 8
 \end{array}$$

Use a calculator in Questions 3-5.

3. One box of potato chips holds 200 grams. There are 24 boxes packed in a case. How many grams of potato chips are there in one case?

3.  $200 \times 24 = 4800$

There are 4800 g of potato chips in one case.

4.  $98 \times 105 = 10\,290$  and  $10\,290 > 10\,000$

Yes, there will be enough skateboards ready to fill the order.

5.  $294 \times 250 = 73\,500$

In a year, 73 500 hamburgers are sold.

4. A skateboard company has orders for 10 000 skateboards to be shipped by the middle of November. If there are 98 working days left before the delivery date, and if 105 skateboards are made per day, will there be enough skateboards ready to fill the order?

5. A cafeteria sells 294 hamburgers a day. There are 250 working days in a year. How many hamburgers are sold in a year?





**Computer Alternative**

6. If you wish to have more instruction and practice in multiplication, try the program for multiplication in *Conquering Whole Numbers* (MECC). Information about the program is in the folder with the disk.
6. Computer checked.

**Guiding the Student**

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

## Concluding Activities

Use your calculator for these activities

- Find your age in hours. Use your age as of your last birthday.

- There are many possible answers.

**Example:** If you are 12 years old, your age in hours is this:

$$12 \times 365 \times 24 = 105\,120$$

**Note:** 12 years may include 2 or 3 leap years. Add  $24 \times 2$  or  $23 \times 3$  hours.

- How many days are there in a decade?

$$2. \quad 365 \times 10 = 3650$$

There are 3650 days in a decade.

**Note:** A decade may include 2 or 3 leap years so 2 or 3 days may be added.

- Many calculators will only display 8 digits. The largest number that can be shown is 99 999 999. Overflow occurs when a result is greater.

Key Press										Display
9	0	0	0	0	0	0	0	2	0	=
										E180000000000000

Find the products using paper and pencil methods. Then predict the calculator display.

- 600 000  $\times$  600
- 15 000 000  $\times$  20
- 360 000 000
  - 300 000 000

## Suggested Answers

## FINDING QUOTIENTS

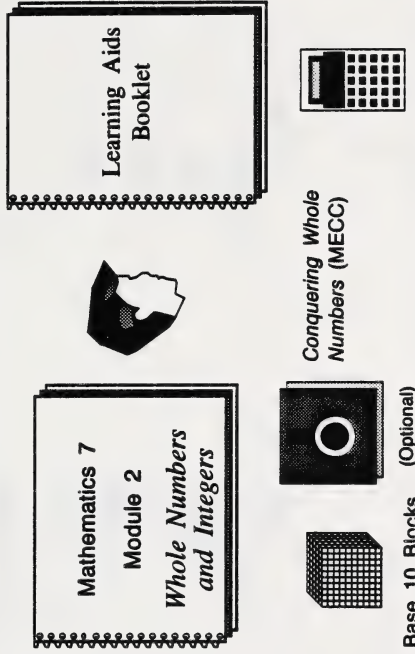
### What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number quotients
- checking the accuracy of exact whole number quotients

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 12 of the module booklet.
- Then have the student do the Learning Aids Activities (Exercise E in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 12 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities****Suggested Answers**

Do not use calculators for Questions 1 and 2.

1. Find the quotient using long division.

a.  $4 \overline{)2248}$

1. a.  $4 \overline{)2248}$   
 $\underline{20}$   
 $\underline{24}$   
 $\underline{24}$   
 $\underline{8}$   
 $8$   
 $\underline{0}$

b.  $7 \overline{)15821}$

b.  $7 \overline{)15821}$   
 $\underline{14}$   
 $\underline{18}$   
 $\underline{14}$   
 $\underline{42}$   
 $\underline{42}$   
 $\underline{1}$   
 $0$   
 $\underline{1}$

c.  $12 \overline{)4308}$

c.  $12 \overline{)4308}$   
 $\underline{36}$   
 $\underline{70}$   
 $60$   
 $\underline{108}$   
 $\underline{108}$   
 $\underline{0}$

d.  $73 \overline{)9858}$

d.  $73 \overline{)9858}$   
 $\underline{73}$   
 $\underline{255}$   
 $\underline{219}$   
 $\underline{368}$   
 $\underline{365}$   
 $\underline{3}$

e.  $352 \overline{)9856}$

e.  $352 \overline{)9856}$   
 $\underline{704}$   
 $\underline{2816}$   
 $\underline{2816}$   
 $\underline{0}$

2. Find the quotient using short division.

a.  $8 \overline{)3046}$

2. a.  $8 \overline{)3046} \text{ R6}$

b.  $4 \overline{)3662}$

b.  $4 \overline{)3662} \text{ R2}$

c.  $3 \overline{)1905}$

c.  $3 \overline{)1905} \text{ R1}$

d.  $3 \overline{)5436}$

d.  $3 \overline{)5436} \text{ R2}$

Use a calculator for Questions 3-5.

3. Find the quotient.

a.  $6381 \div 9$

3. a. 709

b.  $46 \overline{)66930}$

b. 1455

c.  $43010000 \overline{)850}$

c. 50 600



4. A figure skating club sold 98 tickets for a total of \$294. What was the price of one ticket?



4.  $\$294 \div 98 = \$3$

The price per ticket was \$3.

5. A drama theatre can seat 1036 people. There are 28 rows, each with the same number of seats. How many seats are there in each row?

5.  $1036 \div 28 = 37$

There are 37 seats in each row.



**Computer Alternative**

6. The computer program *Conquering Whole Numbers* has a lesson on division. If you wish to have more instruction and practice, use that program. Instructions are given with the disk.
6. Computer checked.

**Guiding the Student**

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

# Concluding Activities

1. Use the casting out nines method to check the division answers in question 1 of the Practice Activities.

a.  $4 \overline{) 2248}$

1. a.

$$\begin{array}{r} 5 + 6 + 2 = 13 \\ 1 + 3 = 4 \end{array}$$

$$\begin{array}{r} 562 \\ 4 \overline{) 2248} \end{array}$$

$$\begin{array}{r} 2 + 2 + 4 + 8 = 16 \\ 1 + 6 = 7 \end{array}$$

$$\begin{array}{r} 4 \leftarrow \text{quotient digit} \\ \times 4 \leftarrow \text{divisor digit} \\ \hline 16 \end{array}$$

$$\begin{array}{c} \uparrow \\ 1 + 6 = 7 \end{array} \leftarrow \text{dividend digit}$$

b.  $7 \overline{) 15821}$

b.

$$\begin{array}{r} 2 + 2 + 6 = 10 \\ 1 + 0 = 1 \end{array}$$

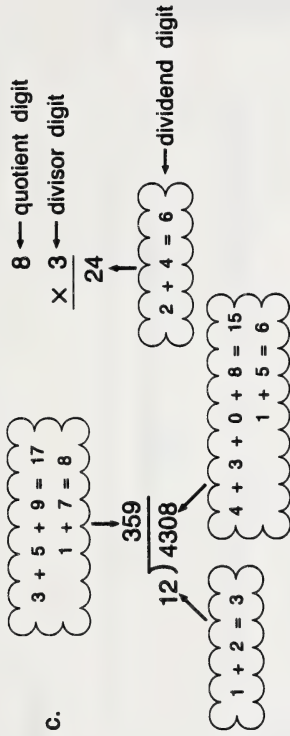
$$\begin{array}{r} 2260 \text{ R}1 \\ 7 \overline{) 15821} \end{array}$$

$$\begin{array}{r} 1 + 5 + 8 + 2 + 1 = 17 \\ 1 + 7 = 8 \end{array}$$

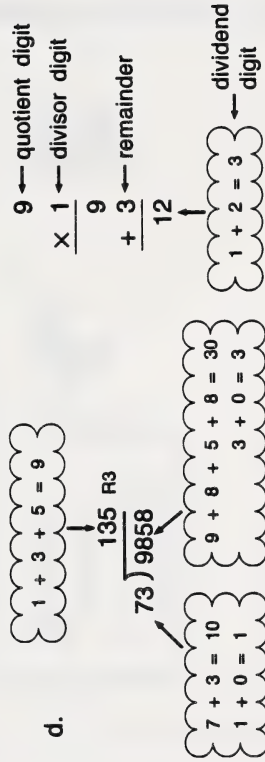
$$\begin{array}{r} 1 \leftarrow \text{quotient digit} \\ \times 7 \leftarrow \text{divisor digit} \\ \hline 7 \end{array}$$

$$\begin{array}{r} + 1 \leftarrow \text{remainder} \\ \hline 8 \leftarrow \text{dividend digit} \end{array}$$

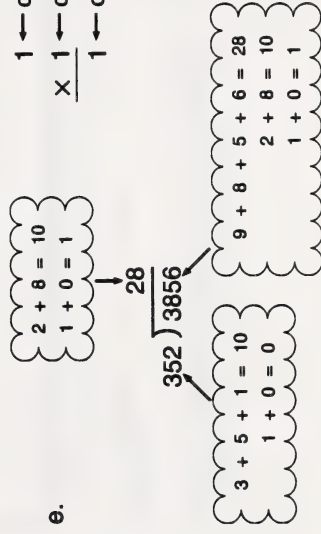
c.  $12 \overline{)4308}$



d.  $73 \overline{)9858}$



e.  $352 \overline{)9856}$



2. Use a calculator and the guess-check-revise method of problem solving to figure out where to place a division sign between the numerals to make a true statement. One has been done as an example.

a.  $48024 = 20$

b.  $3046432 = 952$

c.  $1728144 = 12$

d.  $17289 = 192$

2. a.  $480 \div 24 = 20$

b.  $30464 \div 32 = 952$

c.  $1728 \div 144 = 12$

d.  $1728 \div 9 = 192$

3. Each of these questions needs 2 division signs. One has been done as an example.

a.  $384224 = 8$

b.  $12501025 = 5$

3. a.  $(384 \div 2) \div 24 = 8$

b.  $(1250 \div 10) \div 25 = 5$



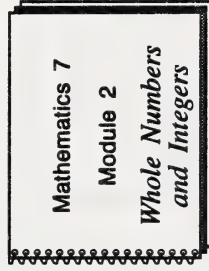
## SUMMARY

### What Lies Ahead

In this summary the student will review the skills taught in Part One.

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student turn to the Summary in the module booklet and review the skills taught in Part One.
- Then have the student turn to Section 1 to review the pretest and to correct any errors.



## GETTING SET

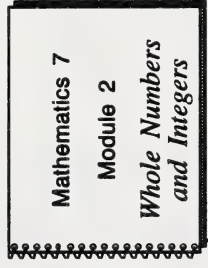
### What Lies Ahead

This section tests these skills.

- computing mentally exact whole number sums, differences, products, and quotients
- using the rules for the order of operations

### Gathering Materials

For this section the student will need this item.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 14 of the module booklet.
- Next have the student do the pretest. The pretest will help you decide what the student will do next.
- Afterwards help the student check the answers. It is **not** necessary for the student to correct any errors at this time. See page 97 for further directions.

**Pretest**

1. Evaluate mentally.

a.  $28 + 15 + 2$

1. a. 
$$\begin{aligned} &28 + 15 + 2 \\ &= 30 + 15 \\ &= 45 \end{aligned}$$

b.  $13 + 15 + 5 + 7$

b. 
$$\begin{aligned} &13 + 15 + 5 + 7 \\ &= 20 + 20 \\ &= 40 \end{aligned}$$

c.  $45 + 38$

c. 
$$\begin{aligned} &45 + 38 \\ &= 43 + 40 \\ &= 83 \end{aligned}$$

d.  $73 + 26$

d. 
$$\begin{aligned} &73 + 26 \\ &= 70 + 20 + 3 + 6 \\ &= 99 \end{aligned}$$

e.  $83 - 69$

e. 
$$\begin{aligned} &83 - 69 \\ &= 84 - 70 \\ &= 14 \end{aligned}$$

**Suggested Answers**

$$f. \quad 72 - 53$$

$$\begin{aligned} f. \quad & 72 - 53 \\ &= 69 - 50 \\ &= 19 \end{aligned}$$

$$g. \quad 99 \times 14$$

$$\begin{aligned} g. \quad & 99 \times 14 \\ &= 100 \times 14 - 1 \times 14 \\ &= 1400 - 14 \\ &= 1386 \end{aligned}$$

$$h. \quad (15 \times 2) + (15 \times 8)$$

$$\begin{aligned} h. \quad & (15 \times 2) + (15 \times 18) \\ &= 15 \times 20 \\ &= 300 \end{aligned}$$

$$i. \quad 20\,000 \div 400$$

$$\begin{aligned} i. \quad & 20\,000 \div 400 \\ &= 200 \div 4 \\ &= 50 \end{aligned}$$

$$j. \quad 380 \div 4$$

$$\begin{aligned} j. \quad & 380 \div 4 \\ &= 360 \div 4 + 20 \div 4 \\ &= 90 + 5 \\ &= 95 \end{aligned}$$



2. Evaluate. Show all steps in the space provided.

a.  $29 - 5 \times 3$

2. a. 
$$\begin{aligned} & 29 - 5 \times 3 \\ &= 29 - 15 \\ &= 14 \end{aligned}$$

b.  $56 \div (10 + 6 - 8)$

b. 
$$\begin{aligned} & 56 \div (10 + 6 - 8) \\ &= 56 \div (16 - 8) \\ &= 56 \div 8 \\ &= 7 \end{aligned}$$

c.  $7 + 7 \times 7 + 7$

c. 
$$\begin{aligned} & 7 + 7 \times 7 + 7 \\ &= 7 + 49 + 7 \\ &= 56 + 7 \\ &= 63 \end{aligned}$$

d. 
$$\frac{3 \times 5 - 1}{16 \div 8}$$

d. 
$$\begin{aligned} & \frac{3 \times 5 - 1}{16 \div 8} \\ &= \frac{15 - 1}{2} \\ &= \frac{14}{2} \\ &= 7 \end{aligned}$$

### Guiding the Student

After checking the answers, compare the student's results with the following chart. This chart lists the skills covered

in the Pretest and the section in which the skill will be taught.

Question	Skill	Section
1a, 1b, 1c, 1d	Adding Mentally	15
1e, 1f	Subtracting Mentally	16
1g, 1h	Multiplying Mentally	17
1i, 1j	Dividing Mentally	18
2	Order of Operations	19

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student

experienced difficulties and only the concluding activities in sections which correspond to the questions with which the student experienced success.



## ADDING MENTALLY

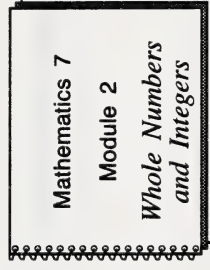
### What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number sums mentally

### Gathering Materials

For this section the student will need these items.



(Optional)

*Mathematics: Using Mental Computation for Addition (AIT)*

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 15 of the module booklet. The student can view the video or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Practice Activities**

1. Are the following equations true or false? Why?

a.  $1803 + 0 = 0$

b.  $(69 + 33) + 7 = 69 + (33 + 7)$

c.  $12 + 7 + 8 + 13 = (7 + 8) + 10 + 13$

d.  $800 + 5 + 60 + 1200 = (1200 + 800) + (60 + 5)$

**Suggested Answers**

Reasons

1. a. False —  $1803 + 0 = 1803$

b. True — associative property or grouping change

c. False —  $40 \neq 38$

d. True — commutative property or order change



2. Add mentally. Look for sums of 10.

a.  $7 + 6 + 8 + 2 + 3$

2. a.  $8 + 2 = 10, 7 + 3 = 10$   
 $10 + 10 + 6 = 26$

b.  $6 + 9 + 1 + 4 + 8$

b.  $9 + 1 = 10, 2 + 8 = 10$   
 $10 + 10 + 8 = 28$

c.  $3 + 2 + 2 + 8 + 7 + 5 + 4 + 5$

c.  $3 + 7 = 10, 2 + 8 = 10, 5 + 5 = 10$   
 $10 + 10 + 10 + 6 = 36$

d.  $7 + 8 + 1 + 2 + 9 + 3 + 5 + 8 + 5$

d.  $7 + 3 = 10, 8 + 2 = 10, 1 + 9 = 10,$   
 $5 + 5 = 10$   
 $10 + 10 + 10 + 10 + 8 = 48$

3. Add mentally. Look for sums of 100.

a.  $75 + 60 + 29 + 25 + 40$

3. a.  $75 + 25 = 100, 60 + 40 = 100$   
 $100 + 100 + 29 = 229$

b.  $50 + 1 + 24 + 76 + 50 + 99 + 3$

b.  $24 + 76 = 100, 50 + 50 = 100, 1 + 99 = 100$   
 $100 + 100 + 100 + 3 = 303$

c.  $25 + 60 + 25 + 40 + 50 + 18$

c.  $25 + 25 + 50 = 100, 60 + 40 = 100$   
 $100 + 100 + 18 = 218$

4. Find the sum mentally. Look for possible changes in order or grouping.

a.  $19 + 15 + 1$

4. a.  $(19 + 1) + 15$   
 $20 + 15 = 35$

b.  $127 + 44 + 3$

b.  $(127 + 3) + 44$   
 $130 + 44 = 174$

c.  $159 + 13 + 7 + 21$

c.  $(159 + 21) + (13 + 7)$   
 $180 + 20 = 200$

5. Add mentally by the left-right method.

a.  $27 + 42$

5. a. 
$$\begin{array}{r} 27 \rightarrow 20 + 7 \\ + 42 \\ \hline 40 + 2 \\ \hline 60 + 9 = 69 \end{array}$$

b. 
$$\begin{array}{r} 12 \\ 61 \\ + 215 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 12 \quad 10 + 2 \\ 61 \rightarrow 60 + 1 \\ 215 \\ \hline 200 + 10 + 5 \\ \hline 200 + 80 + 8 = 288 \end{array}$$

c.  $23 + 66$

c. 
$$\begin{aligned} &23 + 66 \\ &= (20 + 60) + (3 + 6) \\ &= 80 + 9 \\ &= 89 \end{aligned}$$

6. Find the sum mentally by the plus-minus method.

a.  $33 + 57$

6. a. 
$$\begin{array}{r} 33 \rightarrow 33 - 3 \rightarrow 30 \\ + 57 \\ \hline 57 + 3 \\ \hline 60 \\ \hline 90 \end{array}$$

b. 
$$\begin{array}{r} 24 \\ + 78 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 24 \rightarrow 24 - 2 \rightarrow 22 \\ + 78 \\ \hline 78 + 2 \\ \hline 80 \\ \hline 102 \end{array}$$

c.  $55 + 138$

c. 
$$\begin{aligned} &55 + 138 \\ &= (55 - 2) + (138 + 2) \\ &= 53 + 140 \\ &= 193 \end{aligned}$$

7. Add mentally by a method of your choice.

a.  $65 + 3 + 15 + 6 + 5 + 1$

a. 95

b. 
$$\begin{array}{r} 81 \\ + 93 \\ \hline \end{array}$$

b. 174

c. 
$$\begin{array}{r} 176 \\ + 495 \\ \hline \end{array}$$

c. 671

d.  $143 + 71 + 19$

d. 233

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors.
- Afterwards discuss the Concluding Activities.

**Extra Practice****Suggested Answers**

1. Find the sums mentally. Use any of the strategies you learned in this section.

a.  $5 + 3 + 10 + 14 + 2 + 6$

1. a. 40

b. 
$$\begin{array}{r} 35 \\ + 62 \\ \hline \end{array}$$

b. 97

c. 
$$\begin{array}{r} 29 \\ + 46 \\ \hline \end{array}$$

c. 75

d. 
$$\begin{array}{r} 252 \\ + 347 \\ \hline \end{array}$$

d. 599

e.  $50 + 27 + 18 + 100 + 12$

e. 207



2. Mentally compute the distance from Vancouver to Halifax.
2. The distance from Vancouver to Halifax is 6349 km.

Road Distances (km)	
Vancouver to Toronto .....	4492
Toronto to Montreal .....	539
Montreal to Halifax .....	1318

1



### Guiding the Student

- Have the student read “Working Together” and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

## SUBTRACTING MENTALLY

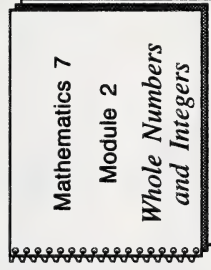
### What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number differences mentally

### Gathering Materials

For this section the student will need these items.



*Mathematics: Using Mental Computation for Subtraction (AIT)*

(Optional)

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 16 of the module booklet. The student can view the video or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

**Practice Activities**

1. What do you get when you subtract zero from a number?  
Write an example.

**Suggested Answers**

1. You get the number that you started with.

**Example:**  $9 - 0 = 9$

2. Is there a commutative property for subtraction? That is, can you reverse the order of the numbers? Write an example to support your answer.

2. No, numbers in a subtraction problem cannot be reversed.

**Example:**  $5 - 3 \neq 3 - 5$

since  $5 - 3 = 2$  and  $3 - 5 = -2$

3. Subtract mentally by the left-right method.

a. 
$$\begin{array}{r} 36 \\ - 13 \\ \hline \end{array}$$

3. a. 
$$\begin{array}{r} 30 + 6 \\ - 10 + 3 \\ \hline 20 + 3 = 23 \end{array}$$

b. 
$$\begin{array}{r} 147 \\ - 25 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 100 + 40 + 7 \\ - 20 + 5 \\ \hline 100 + 20 + 2 = 122 \end{array}$$

c.  $456 - 423$

c. 
$$\begin{array}{r} 400 + 50 + 6 \\ - 400 + 20 + 3 \\ \hline 30 + 3 = 33 \end{array}$$

4. Find the difference mentally by using the attention method.

a.  $63 - 19$

$$\begin{array}{r} 63 \rightarrow 64 \\ - 19 \quad \rightarrow 20 \\ \hline 44 \end{array}$$

b.  $\begin{array}{r} 615 \\ - 498 \\ \hline \end{array}$

$$\begin{array}{r} 615 \rightarrow 617 \\ - 498 \rightarrow 500 \\ \hline 117 \end{array}$$

c.  $\begin{array}{r} 106 \\ - 66 \\ \hline \end{array}$

$$\begin{array}{r} 106 \rightarrow 110 \\ - 66 \rightarrow 70 \\ \hline 40 \end{array}$$

5. Calculate the following mentally. Use a strategy of your choice.

a.  $\begin{array}{r} 80 \\ - 44 \\ \hline \end{array}$

5. a. 36

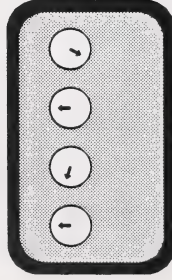
b.  $321 - 123$

b. 198

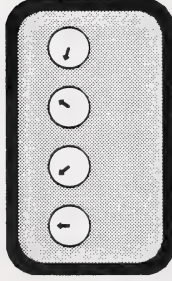
c.  $\begin{array}{r} 3059 \\ - 1046 \\ \hline \end{array}$

c. 2013

6. In January, a gas meter read 0806. In February it read 0918. Compute mentally the increase in the meter reading.



January



February

6. Using the attention method.

$$\begin{array}{r} 918 \rightarrow 912 \\ - 806 \\ \hline - 800 \\ \hline 112 \end{array}$$

The increase in the meter reading is 112.

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.



**Extra Practice****Suggested Answers**

1. Subtract the following mentally. Use any of the strategies you learned in this section.

a.  $99 - 25$

1. a.  $74$

b. 
$$\begin{array}{r} 70 \\ - 39 \\ \hline \end{array}$$

b.  $31$

c.  $335 - 124$

c.  $211$

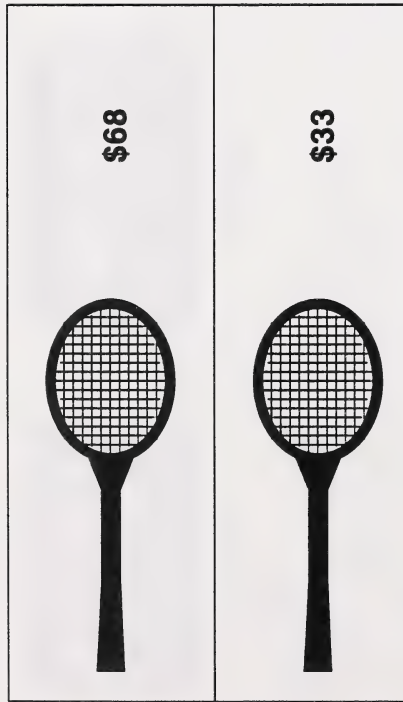
d. 
$$\begin{array}{r} 112 \\ - 83 \\ \hline \end{array}$$

d.  $29$

e.  $60 - 20$

e.  $40$

2. Mentally find the difference in the costs of these tennis rackets.



2.  $68 - 33 = 35$

The difference in the price of the rackets is \$35.

### Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

### Concluding Activities

1. The plus-minus method and the attention method are similar. Explain the difference between these methods. Give examples.

### Suggested Answers

1. The plus-minus method is used in addition.

#### Example

$$\begin{array}{r} 73 \rightarrow 73 + 4 \rightarrow 77 \\ + 14 \quad 14 - 4 \quad + 10 \\ \hline 87 \end{array}$$

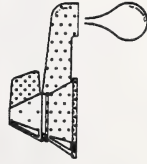
The attention method is used in subtraction.

#### Example

$$\begin{array}{r} 72 \rightarrow 72 + 2 \rightarrow 74 \\ - 28 \quad 28 + 2 \quad - 30 \\ \hline 44 \end{array}$$

2. Try this problem mentally.

Mr. Chase's water meter presently reads 8 530 000 L. Six months ago it read 8 185 000 L. How much water did the Chase family use in this six-month period?



$$\begin{array}{r} 2. \quad 530\,000 \quad \text{OR} \quad 530 \text{ thousand} \\ - 185\,000 \quad \quad - 185 \text{ thousand} \\ \hline \end{array}$$

using attention method

$$\begin{array}{r} 530 + 15 = 545 \\ 185 + 15 = 200 \\ \hline 345 \end{array}$$

The Chase family used 345 thousand or 345 000 L of water during this six-month period.



## MULTIPLYING MENTALLY

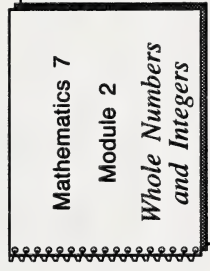
### What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number products mentally

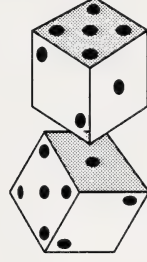
### Gathering Materials

For this section the student will need these items.



(Optional)

*Mathematics: Using Mental Computation for Multiplication (AIT)*



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 17 of the module booklet. The student can view the video or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.



**Practice Activities**

Do either Question 1 or 2.

1. If you watched the video, answer the following questions about the video *SOLVE IT: "Using Mental Computation for Multiplication"*.

- a. What did Jimmy and Claude have to do when the power in the store went off?
- b. Describe the two methods of mental multiplication used by Great-great-granddaddy Claude.

2. If you did not watch the video, explain when in everyday life you might need to multiply mentally.

3. True or false?

a.  $12 \times 0 = 12$

b.  $1 \times 129 = 129$

c.  $9 \times 88 = 88 \times 9$

d.  $3 \times (8 + 20) = 3 \times 8 + 20$

**Suggested Answers**

1. a. See video.

- b. See video.

2. Answers may vary.

3. a. False  $12 \times 0 = 0$

b. True  $129 = 129$

c. True  $792 = 792$

d. False  $3 \times 28 \neq 24 + 20$

4. Use = which means is equal to or  $\neq$  which means is not equal to to make each of the following a true statement.

a.  $69 \times 1$    $69 \times 0$

4. a.  $\neq$

b.  $(8 \times 5) \times 2$    $8 \times (5 \times 2)$

b. =

c.  $(6 \times 9) + (4 \times 9)$    $(6 + 4) \times 9$

c.  $\neq$

d.  $(24 \times 1) + (24 \times 3)$    $24 \times (1 + 3)$

d.  $\neq$

e.  $(16 \times 3) - (14 \times 3)$    $(16 - 4) \times 3$

e.  $\neq$

f.  $(20 + 7) \times (20 + 3)$    $20 + (7 \times 3)$

f.  $\neq$

5. Multiply mentally.

a.  $1000 \times 55$

5. a. 55 000

b.  $4 \times 90$

b. 360

c.  $20 \times 50$

c. 1000

d.  $1200 \times 300$

d. 360 000

e.  $80\,000 \times 700$

e. 56 000 000

6. Find the product mentally.

a.  $5 \times 26 \times 2$

b.  $15 \times 6 \times 5$

c.  $25 \times 18 \times 4$

d.  $12 \times 4 \times 5$

e.  $20 \times 27 \times 5$

f.  $38 \times 25 \times 4$

g.  $(16 \times 2) + (16 \times 18)$

h.  $12 \times 505$

6. a.  $10 \times 26 = 260$

b.  $15 \times 30 = 450$

c.  $100 \times 18 = 1800$

d.  $12 \times 20 = 240$

e.  $100 \times 27 = 2700$

f.  $38 \times 100 = 3800$

g.  $16(2 + 18) = 16 \times 20 = 320$

h.  $12(500 + 5) = 6000 + 60 = 6060$

7. Multiply mentally by the plus-minus method.

a.  $51 \times 9$

b.  $6 \times 86$

c.  $98 \times 4$

7. a.  $(50 \times 9) + (1 \times 9) = 450 + 9 = 459$

b.  $(80 \times 6) + (6 \times 6) = 480 + 36 = 516$

c.  $(100 \times 4) - (2 \times 4) = 400 - 8 = 392$

8. Calculate mentally by the left-right method.

a.  $123 \times 4$

b.  $7 \times 609$

c.  $555 \times 8$

8. a.  $(4 \times 100) + (4 \times 20) + (4 \times 3) = 492$

b.  $(7 \times 600) + (9 \times 7) = 4263$

c.  $(500 \times 8) + (50 \times 8) + (5 \times 8) = 4440$

9. Find the product mentally using a method of your choice.

a.  $67 \times 5$

b.  $7 \times 249$

c.  $102 \times 9$

d.  $42 \times 30$

9. a. 335

b. 1743

c. 918

d. 1260

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

**Extra Practice**

1. Multiply mentally.

a.  $9 \times 4 \times 5$

b.  $12 \times 5 \times 7$

c.  $25 \times 20 \times 4$

d.  $4 \times 80$

e.  $900 \times 300$

2. Multiply mentally. Use the strategies you learned in this section.

a.  $49 \times 6$

b.  $2 \times 135$

c.  $72 \times 5$

**Suggested Answers**

1. a. 180

b. 420

c. 2000

d. 320

e. 270 000

2. a. 294

b. 270

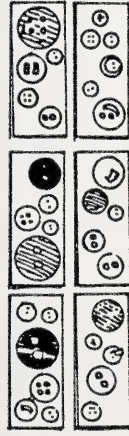
c. 360



# Concluding Activities

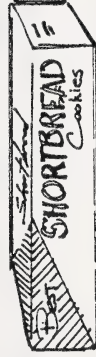
1. Solve mentally.

- a. Lucy has 12 cards each containing 8 smaller buttons, and 12 cards each containing 5 large buttons. In all how many buttons does Lucy have?



- b. One crate has 36 1-L pails of maple syrup. How many litres of maple syrup are there in 30 crates?

- c. A box of cookies has 2 rows of cookies. Each row has 11 cookies. There are 12 boxes of cookies in a crate. How many cookies are in the crate?



# Suggested Answers

1. a.  $12 \times 8 + 12 \times 5$   
 $= 12(8 + 5)$   
 $= 12(10 + 3)$   
 $= 120 + 36$   
 $= 156$

Lucy has 156 buttons in all.

- b.  $36 \times 30$   
 $= (30 \times 30) + (6 \times 30)$   
 $= 900 + 180$   
 $= 1080$

There are 1080 L of maple syrup in 30 crates.

- c.  $2 \times 11 \times 12$   
 $= 22 \times 12$   
 $= (20 + 2) \times 12$   
 $= 240 + 24$   
 $= 264$

There are 264 cookies in the crate.



## DIVIDING MENTALLY

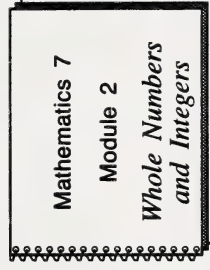
### What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number quotients mentally

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 18 of the module booklet.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.
- Then have the student do the Practice Activities.

**Practice Activities**

1. Write the division in 3 different ways.

a. 105 divided by 7

1. a.  $7 \overline{)105}$ ;  $105 \div 7$ ;  $\frac{105}{7}$

b. 3028 divided by 4

b.  $4 \overline{)3028}$ ;  $3028 \div 4$ ;  $\frac{3028}{4}$

2. Use = or  $\neq$  to make a true statement for each of the following.

a.  $20 \div 1$   $\bigcirc$  20

2. a. =

b.  $8 \div 0$   $\bigcirc$  0

b.  $\neq$

c.  $20 \div 4$   $\bigcirc$   $4 \div 20$

c.  $\neq$

d.  $(12 \div 6) \div 3$   $\bigcirc$   $(12 \div 3) + (6 \div 3)$

d. =

e.  $(48 \div 12) \div 2$   $\bigcirc$   $48 \div (12 \div 2)$

e.  $\neq$

**Suggested Answers**

## 3. Divide mentally.

a.  $650 \div 10$

b.  $3\,200 \div 40$

c.  $20\,000 \div 500$

d.  $\frac{48\,000}{6\,000}$

e.  $400 \div 200$

3. a. 65

b. 80

c. 40

d. 8

e. 2

## 4. Divide mentally by the plus-minus method.

a.  $3 \overline{)207}$

$$\begin{aligned}
 4. \quad a. \quad & 207 \div 3 \\
 & = (210 \div 3) - (3 \div 3) \\
 & = 70 - 1 \\
 & = 69
 \end{aligned}$$

b.  $96 \div 2$

$$\begin{aligned}
 b. \quad & 96 \div 2 \\
 & = (90 \div 2) + (6 \div 2) \\
 & = 45 + 3 \\
 & = 48
 \end{aligned}$$

c.  $\frac{396}{4}$

$$\begin{aligned}
 c. \quad & 396 \div 4 \\
 & = (400 \div 4) - (4 \div 4) \\
 & = 100 - 1 \\
 & = 99
 \end{aligned}$$



5. Find the quotient mentally by the left-right method.

a.  $369 \div 9$

5. a.  $396 \div 9$   
=  $(360 \div 9) + (36 \div 9)$   
=  $40 + 4$   
=  $44$

b.  $\frac{425}{5}$

b.  $425 \div 5$   
=  $(400 \div 5) + (25 \div 5)$   
=  $80 + 5$   
=  $85$

c.  $8 \overline{)656}$

c.  $656 \div 8$   
=  $(640 \div 8) + (16 \div 8)$   
=  $80 + 2$   
=  $82$

6. Divide mentally, using a method of your choice.

a.  $\frac{1836}{6}$

6. a. 306

b.  $5 \overline{)2980}$

b. 596

c.  $558 \div 9$

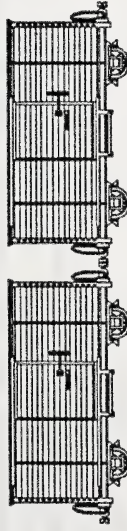
c. 62

## 7. Solve mentally.

- a. If there are 12 000 tonnes of grain in 40 boxcars, how many tonnes are in each boxcar?

7. a.  $12\,000 \div 40 = 300$

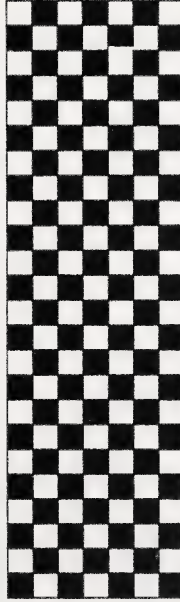
There are 300 tonnes of grain in each boxcar.



- b. If 168 tiles will cover the floor and there are 7 tiles in a column, how many columns of tiles are there?

b. 
$$\begin{aligned} &168 \div 7 \\ &= (140 \div 7) + (28 \div 7) \\ &= 20 + 4 \\ &= 24 \end{aligned}$$

In all there are 24 columns of tiles on this floor.



## Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards discuss the student's game results.

**Extra Practice**

1. Find the missing quotient, divisor, or dividend.

a.  $31\,000 \div \square = 310$

b.  $\frac{\square}{1} = 4$

c.  $5 \overline{) \square 6000}$

d.  $\square \div 400 = 30$

e.  $\square \overline{) 810\,000}^{900}$

2. Divide mentally, using the methods you learned in this lesson.

a.  $84 \div 7$

b.  $4 \overline{) 196}$

c.  $486 \div 6$

**Suggested Answers**

1. a. 100

b. 4

c. 1200

d. 12 000

e. 900

2. a. 12

b. 49

c. 81

**Guiding the Student**

- Have the student read “Working Together” and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

**Concluding Activities****Suggested Answers**

Use a calculator for this activity.

1. Many people make the error of thinking that dividing by zero should give zero for an answer. Here is an investigation to help you think about that idea. With a calculator, do the following series of divisions in the order shown, and record your answers.

a.  $100 \div 100 =$

b.  $100 \div 50 =$

c.  $100 \div 25 =$

d.  $100 \div 20 =$

e.  $100 \div 10 =$

f.  $100 \div 5 =$

g.  $100 \div 4 =$

h.  $100 \div 2 =$

i.  $100 \div 1 =$

1. a. 1

b. 2

c. 4

d. 5

e. 10

f. 20

g. 25


h. 50

i. 100

2. Notice that the divisors in question 1 are a set of numbers which become smaller and smaller. That is, they approach zero.

What pattern or trend can you see in the answers? What does this trend suggest about division by zero and the possibility of getting zero as an answer?

2. When the divisor becomes smaller, the quotient becomes larger. From this pattern you can see that using zero as a divisor will never result in zero.

3. Enter any whole number, divide it by 0, and press . What appears on the display? Why?

3. “Error” appears on the display because you cannot divide by zero. Division by zero is undefined.



## ORDER OF OPERATIONS

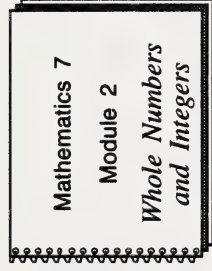
### What Lies Ahead

In this section the student will learn this skills.

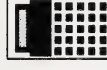
- using the correct order of operations in calculations

### Gathering Materials

For this section the student will need these items.



(Optional)



*Computer Drill and Practice:*  
*Mathematics, Level D (SRA)*

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 19 of the module booklet.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

## Practice Activities

1. Evaluate.

a.  $2 \times 24 \div 6 - 6 + 6$

1. a. 
$$\begin{aligned} & 2 \times 24 \div 6 - 6 + 6 \\ &= 2 \times 4 - 6 + 6 \\ &= 8 - 6 + 6 \\ &= 8 \end{aligned}$$

b.  $2 + 8 \div 2 - 5$

b. 
$$\begin{aligned} & 2 + 8 \div 2 - 5 \\ &= 2 + 4 - 5 \\ &= 6 - 5 \\ &= 1 \end{aligned}$$

c.  $42 - (9 \times 2) \div 3$

c. 
$$\begin{aligned} & 42 - (9 \times 2) \div 3 \\ &= 42 - 18 \div 3 \\ &= 42 - 6 \\ &= 36 \end{aligned}$$

d.  $(9 \times 2 \times 2) \div 12$

d. 
$$\begin{aligned} & (9 \times 2 \times 2) \div 12 \\ &= (18 \times 2) \div 12 \\ &= 36 \div 12 \\ &= 3 \end{aligned}$$

e.  $12 + 5 \times 2 - 34 \div 2$

e. 
$$\begin{aligned} & 12 + 5 \times 2 - 34 \div 2 \\ &= 12 + 5 \times 2 - 17 \\ &= 12 + 10 - 17 \\ &= 22 - 17 \\ &= 5 \end{aligned}$$

## Suggested Answers

2. Use  $<$ ,  $>$ , or  $=$  to make a true statement.

a.  $(8 + 3) \times 5$   $\bigcirc$   $8 + 3 \times 5$

2. a.  $<$

b.  $7 + 1 \times 4$   $\bigcirc$   $5 \times 2 + 6$

b.  $<$

c.  $4 \times 9 \div 4$   $\bigcirc$   $8 + 2 \times 2$

c.  $=$

d.  $24 - 12 \div 6$   $\bigcirc$   $2 + 6 \times 0$

d.  $>$

e.  $3 \times 3 \div 3$   $\bigcirc$   $3 \div 3 \times 3$

e.  $=$

3. Evaluate.

a.  $\frac{8 + 3 - 1}{2 \times 5 - 8}$

b.  $\frac{32 - 8}{3 \times 3 \div 3 + 3}$

c.  $\frac{(2 \times 3) \times 4}{10 - 2 \times 3}$

d.  $\frac{4 + 2 \times 2 + 4}{(4 \times 6) \div 12}$

e.  $\frac{20 - 3 \times 2}{(15 + 7) \div 11}$

3. a.  $\frac{11 - 1}{10 - 8} = \frac{10}{2} = 5$

b.  $\frac{24}{9 \div 3 + 3} = \frac{24}{3 + 3} = \frac{24}{6} = 4$

c.  $\frac{6 \times 4}{10 - 6} = \frac{24}{4} = 6$


d.  $\frac{4 + 4 + 4}{24 \div 12} = \frac{12}{2} = 6$

e.  $\frac{20 - 6}{22 \div 11} = \frac{14}{2} = 7$

**Guiding the Student**

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors.

**Extra Practice****Computer Alternative**

1. Do Lessons 1 and 2 of the Pre-Algebra disk from the package *Computer Drill and Practice: Mathematics, Level D*. Read the instructions in the folder with the disk before using the program. Remember if you need help or have an error hold down the SHIFT key and press the  key.

**Note:** • means multiply.

**Print Alternative**

2.  $9 - 5 + 4 \times 9 - 26 \div 13$ .

- a. Which operation is performed first?
- b. Which operation is performed next?
- c. Find the value of the expression.

3. Evaluate  $16 - (8 \times 4) \div 32$ .

- a. Which operation is performed first?
- b. Which operation is performed next?
- c. Find the value of the expression.

**Suggested Answers**

1. Computer-checked.

2. a.  $26 \div 13$

b.  $4 \times 9$

c. 
$$\begin{aligned} 9 - 5 + 4 \times 9 - 26 \div 13 \\ = 4 + 35 - 2 \\ = 40 - 2 \\ = 38 \end{aligned}$$

3. a.  $(8 \times 4)$

b.  $32 \div 32$

c. 
$$\begin{aligned} 16 - (8 \times 4) \div 32 \\ = 16 - 32 \div 32 \\ = 16 - 1 \\ = 15 \end{aligned}$$



4. Find the value.

a.  $8 \times 7 + 5$

4. a.  $8 \times 7 + 5$   
 $= 56 + 5$   
 $= 61$

b.  $(9 \times 5) \div 3$

b.  $(9 \times 5) \div 3$   
 $= 45 \div 3$   
 $= 15$

c.  $32 + 8 \div 4$

c.  $32 + 8 \div 4$   
 $= 32 + 2$   
 $= 34$

d.  $56 \div 7 \div 8$

d.  $56 \div 7 \div 8$   
 $= 8 \div 8$   
 $= 1$

e.  $(175 + 12) \times 10$

e.  $(175 + 12) \times 10$   
 $= 187 \times 10$   
 $= 1870$

f.  $29 - 16 \div 4 + 7$

d.  $29 - 16 \div 4 + 7$   
 $= 29 - 4 + 7$   
 $= 25 + 7$   
 $= 32$

g.  $5 \times 6 \div (13 - 10)$

g.  $5 \times 6 \div (13 - 10)$   
 $= 30 \div 3$   
 $= 10$

### Guiding the Student

- Have the student read “Working Together” and do the Concluding Activities.
- Afterwards check the answers and correct any errors.

**Concluding Activities**

1. Evaluate the following on paper first. Then use your calculator to get the same result. Remember to clear the calculator display before computing. To do this press **C**.

a.  $12 + 5 \times 2$

b.  $18 + 6 \div 3$

c.  $19 - 6 \times 2 + 3$

d.  $20 - 8 \div 4 - 5$


**Suggested Answers**

1. a.  $12 + 5 \times 2$   
     $= 12 + 10$   
     $= 22$

b.  $18 + 6 \div 3$   
     $= 18 + 2$   
     $= 20$

c.  $19 - 6 \times 2 + 3$   
     $= 19 - 12 + 3$   
     $= 7 + 3$   
     $= 10$

d.  $20 - 8 \div 4 - 5$   
     $= 20 - 2 - 5$   
     $= 18 - 5$   
     $= 13$

2. Evaluate the following on paper first. Then use your calculator to get the same result. Remember to clear the calculator display before computing. To do this press .

a.  $(5 + 3) \times (9 - 2)$

3. a.  $(5 + 3) \times (9 - 2)$   
 $= 8 \times 7$   
 $= 56$

b.  $(3 + 5 - 2) \div (7 - 5)$

b.  $(3 + 5 - 2) \div (7 - 5)$   
 $= (8 - 2) \div (2)$   
 $= 6 \div 2$   
 $= 3$

c.  $156 \div (29 - 17)$

c.  $156 \div (29 - 17)$   
 $= 156 \div 12$   
 $= 13$

d.  $15 - (13 - 2)$

d.  $15 - (13 - 2)$   
 $= 15 - (11)$   
 $= 4$

3. Evaluate the following on paper first. Then use your calculator to get the same answer. Remember to clear the calculator's memory and the calculator display before computing. Press **MC** to clear the memory.

a.  $9 + 3 \times 15 - 11$

3. a. 
$$\begin{aligned} &9 + 3 \times 15 - 11 \\ &= 9 + 45 - 11 \\ &= 54 - 11 \\ &= 43 \end{aligned}$$

b.  $(8 + 9) - (7 + 2)$

b. 
$$\begin{aligned} &(8 + 9) - (7 + 2) \\ &= 17 - 9 \\ &= 8 \end{aligned}$$

c.  $(12 - 6) \times (10 - 7)$

c. 
$$\begin{aligned} &(12 - 6) \times (10 - 7) \\ &= 6 \times 3 \\ &= 18 \end{aligned}$$

d.  $7 \times (5 - 3)$

d. 
$$\begin{aligned} &7 \times (5 - 3) \\ &= 7 \times 2 \\ &= 14 \end{aligned}$$

4. Use parentheses to make a true statement.

a.  $5 \times 2 - 1 = 5$

4. a.  $5 \times (2 - 1) = 5$

b.  $28 - 12 \div 4 = 4$

b.  $(28 - 12) \div 4 = 4$

c.  $7 - 5 \times 12 = 24$

c.  $(7 - 5) \times 12 = 24$

d.  $38 - 13 + 17 - 12 = 20$

d.  $38 - (13 + 17 - 12) = 20$

e.  $54 \div 12 + 6 \times 6 = 18$

e.  $54 \div (12 + 6) \times 6 = 18$

f.  $8 \div 4 + 2 \div 2 + 9 \div 3 + 3 \div 3 - 4 = 0$

f.  $(8 \div 4 + 2) \div 2 + (9 \div 3 + 3) \div 3 - 4 = 0$





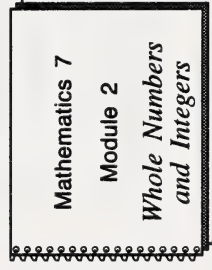
## SUMMARY

### What Lies Ahead

In this summary the student will review the skills taught in Part Two.

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student turn to Section 20 in the module booklet and review the skills taught in Part Two.
- Then have the student turn to Section 14 to review the pretest and to correct any errors.



## GETTING SET

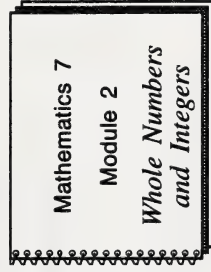
### What Lies Ahead

This section will test these skills.

- identifying multiples of whole numbers
- finding multiples, common multiples, and LCM
- finding factors, common factors, and GCF
- classifying numbers as prime or composite
- writing a number as the product of prime factors
- deciding if a number is divisible by 2, 3, 5, 6, 9, or 10
- recognizing powers
- writing the value of a power
- writing numbers in expanded form using powers
- recognizing an integer
- comparing and ordering integers
- adding integers using counters and number lines

### Gathering Materials

For this section the student will need these items.



(Optional)



Disk of MAC 6 "Number Stumper"

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 21 of the module booklet.
- Next have the student do the pretest. This will help you decide what the student will do next.

- Afterwards help the student check the answers. It may not be necessary for the student to correct any errors. See page 150 for further directions.

**Pretest**

1. Give the first five multiples of the number.

- a. 2  
b. 3  
c. 4

2. Is the second number a multiple of the first?

- a. 3, 24  
b. 7, 74  
c. 35, 5

3. Give all the factors of each number below.

- a. 14  
b. 26  
c. 42

**Suggested Answers**

1. a. 2, 4, 6, 8, 10  
b. 3, 6, 9, 12, 15  
c. 4, 8, 12, 16, 20

2. a.  $24 \div 3 = 8$  Yes  
b.  $74 \div 7 = 10 \text{ R}4$  No  
c.  $5 \div 35 = \frac{1}{7}$  No

3. a. 1, 2, 7, 14  
b. 1, 2, 13, 26  
c. 1, 2, 3, 6, 7, 14, 21, 42

d. 42

a. 34

50  
C.

c.

$$\begin{array}{c}
 50 \\
 \swarrow \quad \searrow \\
 5 \times 10 \\
 \swarrow \quad \searrow \\
 5 \times 5 \quad 5 \times 2
 \end{array}$$

OR

$$\begin{array}{r}
 2 \overline{) 50} \\
 \underline{40} \phantom{0} \\
 10 \phantom{0} \\
 \underline{10} \phantom{0} \\
 0
 \end{array}$$

So  $50 = 2 \times 5 \times 5$

7. Is 17 245 divisible by each of the numbers? Do not divide or use a calculator.

- |       |          |
|-------|----------|
| a. 2  | 7. a. No |
| b. 3  | b. No    |
| c. 5  | c. Yes   |
| d. 9  | d. No    |
| e. 10 | e. No    |

8. Write each of these numbers as a power of ten.

- |           |              |
|-----------|--------------|
| a. 100    | 8. a. $10^2$ |
| b. 1000   | b. $10^3$    |
| c. 10 000 | c. $10^4$    |

9. Name the base and the exponent in each power given.

- |               |   |
|---------------|---|
| a. $10^1$     | 9. a. The base is 10 and the exponent is 1. |
| b. $25^{100}$ | b. The base is 25 and the exponent is 100.  |



10. Express each number given as a power.

a. 25

10. a.  $5^2$

b. 32

b.  $2^5$

c. 81

c.  $3^4$

11. Find the value of each power given.

a.  $7^2$

11. a. 49

b.  $10^6$

b. 1 000 000

c.  $4^3$

c. 64

12. Represent each of the following by a positive or negative number.

a.  $10^{\circ}\text{C}$  below freezing

12. a.  $-10$

b. 5 floors above ground level

b.  $+5$

c. 2 under par

c.  $-2$

d. 80 m below sea level

d.  $-80$

e. \$92 overdrawn

e.  $-92$

13. Use  $>$  or  $<$  to make a true statement for each of these.

a.  $-6$   $\bigcirc$   $+1$

b.  $+15$   $\bigcirc$   $-2$

c.  $-8$   $\bigcirc$   $-5$

d.  $+4$   $\bigcirc$   $+3$

13. a.  $-6 < +1$

b.  $+15 > -2$

c.  $-8 < -5$

d.  $+4 > +5$

14. Write the opposite of each of the following.

a.  $+3$

b.  $-5$

c.  $0$

14. a.  $-3$

b.  $+5$

c.  $0$

15. Complete the following number sentences. Use counters or number lines to add.

a.  $(+8) + (+2) = \square$

b.  $(-3) + (-5) = \square$

c.  $(+2) + (-7) = \square$

d.  $(-4) + (+9) = \square$

15. a.  $(+8) + (+2) = +10$

b.  $(-3) + (-5) = -8$

c.  $(+2) + (-7) = -5$

d.  $(-4) + (+9) = +5$

### Guiding the Student

After checking the answers, compare the student's results with the following chart. (The chart lists the skills covered

in the Pretest and the section in which the skill will be taught.)

Question	Skill	Section
1, 2	Finding Multiples	22
3	Finding Factors	23
4, 5	Identifying Primes and Composite Numbers	24
6	Writing Prime Factorization	25
7	Using Divisibility Rules	26
8, 9, 10, 11	Interpreting Powers	27
12, 13	Recognizing Integers	28
14, 15	Adding Integers	29

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student

experienced difficulties and only the Concluding Activities in sections which correspond to the questions with which the student experienced success.

## MULTIPLES

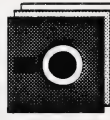
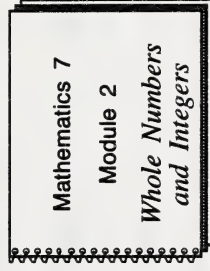
### What Lies Ahead

In this section the student will learn these skills.

- identifying multiples of whole numbers
- finding multiples of whole numbers
- finding the least common multiple of two or more whole numbers

### Gathering Materials

For this section the student will need these items.



(Optional)



Number Munchers  
"Multiples"

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 22 of the module booklet.
- Afterwards help the student check the answers.
- Have the student do the Practice Activities.

**Practice Activities**

1. Give the first five multiples of each number given.

a. 3

b. 5

c. 6

d. 7

2. Is the first number a multiple of the second number?

a. 94, 7

b. 86, 4

c. 98, 12

d. 56, 14

e. 35, 7

f. 49, 6

**Suggested Answers**

1. a. 3, 6, 9, 12, 15

b. 5, 10, 15, 20, 25

c. 6, 12, 18, 24, 30

d. 7, 14, 21, 28, 35

2. a. No, since  $94 \div 7 = 13 \text{ R}3$ .

b. No, since  $86 \div 4 = 21 \text{ R}2$ .

c. No, since  $98 \div 12 = 8 \text{ R}2$ .

d. Yes, since  $56 \div 14 = 4$ .

e. Yes, since  $35 \div 7 = 5$ .

f. No, since  $49 \div 6 = 8 \text{ R}1$ .



3. a. Is 6 a multiple of 3?

3. a. Yes, since  $6 \div 3 = 2$ .

b. Is 3 a multiple of 6?

b. No, since  $3 \div 6 = 0.5$ .

c. Is 297 a multiple of 3?

c. Yes, since  $297 \div 3 = 99$ .

d. Is 297 a multiple of 6?

d. No, since  $297 \div 6 = 49.5$ .

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors.
- Afterwards, discuss the Concluding Activities.

**Extra Practice**

1. Give the first six multiples of the following numbers.

a. 2

b. 4

c. 12

2. Is the first number a multiple of the second number?

a. 86, 2

b. 26, 4

c. 23, 3

d. 75, 5

**Suggested Answers**

1. a. 2, 4, 6, 8, 10, 12

b. 4, 8, 12, 16, 20, 24

c. 12, 24, 36, 48, 60, 72

2. a. Yes, since  $86 \div 2 = 43$ .

b. No, since  $26 \div 4 = 6 \text{ R}2$ .

c. No, since  $23 \div 7 = 7 \text{ R}2$ .

d. Yes, since  $75 \div 5 = 15$ .

**Guiding the Student**

- Have the student read “Working Together” and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

**Concluding Activities**

**Computer Alternative**

1. Play the game "Multiples" on the *Number Munchers* disk.

**Print Alternative**

2. Play the game "Multiple Tic-Tac-Toe" with another person. You will need one die and several 2-coloured disks. Use the game board provided in the appendix of the module booklet.

**Suggested Answers**

1. Computer checked.
2. Directions are in the module booklet. Discuss the game result with the student.



## FACTORS

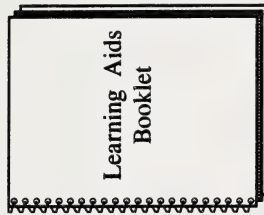
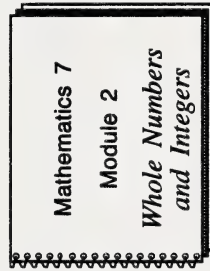
### What Lies Ahead

In this section the student will learn these skills.

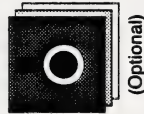
- finding the factors of a number
- finding the greatest common factor of two or more numbers

### Gathering Materials

For this section the student will need these items.



Base 10 Blocks (Optional)



Number Munchers "Factors"  
Conquering Whole Numbers  
"Tax Collector"

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 23 in the module booklet.
- Next have the student do the Learning Aids Activities (Exercise F in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.

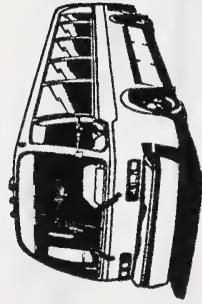
- After the student has completed the Learning Aids Activities, have the student return to Section 23 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities**

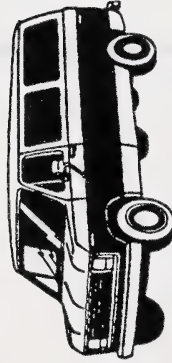
Use whole numbers to answer the Questions.

1. There are 168 people going skiing.

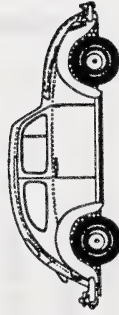
- a. A bus can take 42 people.  
How many buses would be needed to provide transportation for all the people going skiing?



- b. A van can take 12 people.  
How many vans would be needed to accommodate all the people going skiing?



- c. A car can take 4 people.  
How many cars would be needed to take all the skiers skiing?

**Suggested Answers**

1. a. The number of buses needed is  $168 \div 42 = 4$ .

- b. The number of vans needed is  $168 \div 12 = 14$ .

- c. The number of cars needed is  $168 \div 4 = 42$ .



2. Find all the factors of the numbers.

a. 30

2. a. 1, 2, 3, 5, 6, 10, 15, 30

b. 32

b. 1, 2, 4, 8, 16, 32

c. 59

c. 1, 59

d. 70

d. 1, 2, 5, 10, 14, 35, 70

3. Does each of the following numbers have 8 as a factor?

- a. 30
  - b. 40
  - c. 87
  - d. 144
3. a. No  
b. Yes  
c. No  
d. Yes

4. Complete with the word “factor” or “multiple.”

- a. 3 is a \_\_\_\_\_ of 12 and  
12 is a \_\_\_\_\_ of 3.
  - b. 12 is a \_\_\_\_\_ of 4 and  
4 is a \_\_\_\_\_ of 12.
4. a. factor; multiple  
b. multiple; factor

5. What number is a factor of every number? 5. A factor of every number is 1.

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read “Working Together” and do the Concluding Activities.
- Afterwards, discuss the Concluding Activities.

**Extra Practice****Suggested Answers****Computer Alternative**

1. Play the game "Factors" on the *Number Munchers* disk.

1. Computer checked.

**Print Alternative**

2. Copy and supply the missing factors.

a.  $1 \times \boxed{\phantom{00}} = 20$

2. a.  $1 \times \boxed{20} = 20$

b.  $2 \times \boxed{\phantom{00}} = 20$

b.  $2 \times \boxed{10} = 20$

c.  $4 \times \boxed{\phantom{00}} = 20$

c.  $4 \times \boxed{5} = 20$

d.  $5 \times \boxed{\phantom{00}} = 20$

d.  $5 \times \boxed{4} = 20$

- e. Give all the factors of 20.

- e. All the factors of 20 are 1, 2, 4, 5, 10, and 20.

3. a. What number do you try first when finding all the factors of 28?  
b. Do you get a factor?  
c. What number do you try next?  
d. Do you get a factor?  
e. Continue until you have all the factors of 28.
3. a. The number 1 is tried first.  
b. Yes, the factor is 28.  
c. The number 2 is tried next.  
d. Yes, the factor is 14.  
e. All the factors of 28 are 1, 2, 4, 7, 14, and 28.
4. a. What are the factors of 36?  
b. What are the factors of 45?
4. a. The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36.  
b. The factors of 45 are 1, 3, 5, 9, 15, and 45.

### Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the game results.

**Concluding Activities****Computer Alternative**

1. Play the game "Tax Collector" on the *Conquering Whole Numbers* disk.

**Suggested Answers**

1. Computer checked.

**Print Alternative**

2. Play the game "Tax Collector" with a partner.

You will need the coins which are found in the appendix of the module booklet.

2. Rules for the game are in the module booklet. Discuss the game results with the student.





## PRIME AND COMPOSITE NUMBERS

### What Lies Ahead

In this section the student will learn this skill.

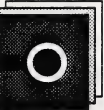
- classifying numbers as prime or composite

### Gathering Materials

For this section the student will need these items.



Base 10 Blocks (Optional)



Computer Instruction and Drill:  
Mathematics, Level D  
Number Munchers: Primes

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 24 in the module booklet.
- Next have the student do the Learning Aids Activities (Exercise G in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.

- After the student has completed the Learning Aids Activities, have the student return to Section 24 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities**

1. a. Complete the table.

**Suggested Answers**

Number	Factors	Number of Factors
1	1	1
2	1, 2	2
3	1, 3	2
4	1, 2, 4	3
5	1, 5	2
6	1, 2, 3, 6	4
7	1, 7	2
8	1, 2, 4, 8	4
9	1, 3, 9	3
10	1, 2, 5, 10	4
11	1, 11	2
12	1, 2, 3, 4, 6, 12	6
13	1, 13	2
14	1, 2, 7, 14	4
15	1, 3, 5, 15	4
16	1, 2, 4, 8, 16	5
17	1, 17	2
18	1, 2, 3, 6, 9, 18	6
19	1, 19	2
20	1, 2, 4, 5, 10, 20	6

- b. What type of number has exactly two factors?
- c. What type of number has more than two factors?
- d. Make a list showing the smallest number having exactly 1 factor, exactly 2 factors, and so on up to 6 factors.

- b. A prime number has exactly two factors.
- c. A composite number has more than two factors.
- d. 1 has 1 factor. It is 1.  
 2 has 2 factors. They are 1 and 2.  
 4 has 3 factors. They are 1, 2, and 4.  
 6 has 4 factors. They are 1, 2, 3, and 6.  
 16 has 5 factors. They are 1, 2, 4, 8, and 16.  
 12 has 6 factors. They are 1, 2, 3, 4, 6, and 12.

Use the Sieve of Eratosthenes to answer Questions 2-5.

2. Find a pair of prime numbers that has a difference of 1.
3. A pair of prime numbers which has a difference of 2 is called a **twin prime**.

How many twin primes are there between 2 and 25?

2. The pair 3 and 2 has a difference of 1.

3. There are 4 twin primes between 2 and 25.

They are 3 and 5  
 5 and 7  
 11 and 13  
 and 17 and 19


4. What is the sum of the 1st, 2nd, 3rd, and 4th primes? Is this sum prime?
4. When these primes are added the sum is  $2 + 3 + 5 + 7 = 17$ . Yes, this sum is prime.
5. Find four pairs of prime numbers where each pair has a sum of 50.
5. Four pairs of prime numbers whose sums equal 50 are
- 3 and 47  
7 and 43  
13 and 37  
and 19 and 31

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors.
- Afterwards, help the student check the answers and correct any errors.

**Extra Practice**

**Computer Alternative**

1. Do Lesson 14 of the “Numbers and Numeration” disk of the package *Computer Instruction and Drill: Mathematics, Level D*. Read the instructions in the folder with the disk before you use the program. Remember, if you need help or have an error, hold down the SHIFT key and press the  key.

**Suggested Answers**

1. Computer checked.
2. Computer checked.

2. Play the game “Primes” on the *Number Munchers*” disk.

**Print Alternative**

3. a. What is your age?  
b. Is your age a prime or a composite number? Why?
3. a. Answer depends on age.  
b. Answers depend on age. 1 and 13 are primes. 12, 14, and 15 are composite numbers.

4. Is each of the following numbers prime or composite? Tell why in each case.

a. 6

4. a. 6 is a composite number since it has 4 factors. The factors are 1, 2, 3, and 6.

b. 11

b. 11 is a prime number since it has 2 factors. The factors are 1 and 11.

c. 29

c. 29 is a prime number since it has 2 factors. The factors are 1 and 29.

d. 33

d. 33 is a composite number since it has 4 factors. The factors are 1, 3, 11, and 33.

e. 50

e. 50 is a composite number since it has 6 factors. The factors are 1, 2, 5, 10, 25, and 50.

### Guiding the Student

- Have the student do the Concluding Activities.

- Afterwards help the student check the answers.



**Concluding Activities**

1. The numbers 11 and 101 are prime.

a. Is 1001 prime?

b. Is 10001 prime?

c. Is 100001 prime?

2. A mathematician named Christian Goldbach theorized in 1742 that every even natural number is equal to the sum of two primes. Test his theory using each of the following numbers.

a. 4

b. 6

c. 8

d. 10

e. 12

**Suggested Answers**

1. a. No, since  $1001 = 7 \times 11 \times 13$ . 1001 has 5 factors which are 1, 7, 11, 13, and 1001.

b. Yes, 10001 is prime.

- c. No, since  $100001 = 11 \times 9091$ . 100001 has 4 factors which are 1, 11, 9091, and 100001.

2. a.  $2 + 2 = 4$

b.  $3 + 3 = 6$

c.  $3 + 5 = 8$

d.  $5 + 5 = 10$

e.  $5 + 7 = 12$

f. 20

f.  $3 + 17 = 20$

g. 26

g.  $3 + 23 = 26$

h. 38

h.  $7 + 31 = 38$

i. 50

i.  $3 + 47 = 50$

j. 72

j.  $5 + 67 = 72$

3. Christian Goldbach also believed that a natural number greater than 7 (even or odd) is equal to the sum of 3 primes. Test his theory using the following numbers.

a. 8

3. a.  $2 + 3 + 3 = 8$

b. 9

b.  $2 + 2 + 5 = 9$

c. 10

c.  $2 + 3 + 5 = 10$

d. 11

d.  $3 + 3 + 5 = 11$

e. 12

e.  $2 + 5 + 5 = 12$

f. 17

$$f. \ 5 + 5 + 7 = 17$$

g. 33

$$g. \ 3 + 13 + 17 = 33$$

h. 52

$$h. \ 2 + 13 + 37 = 52$$

i. 75

$$i. \ 3 + 5 + 67 = 75$$

j. 101

$$j. \ 3 + 5 + 93 = 101$$

## PRIME FACTORS

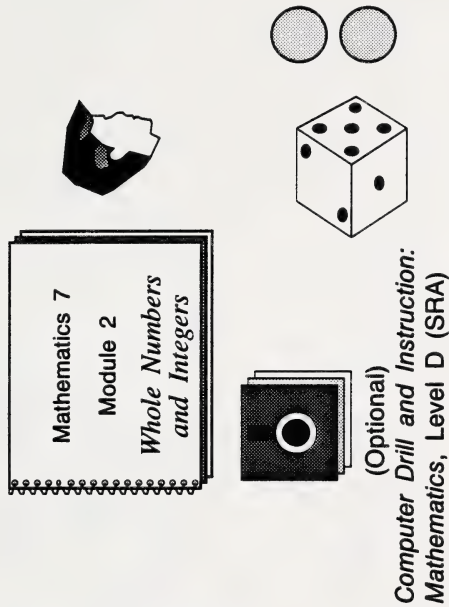
### What Lies Ahead

In this section the student will learn these skills.

- recognizing prime factors
- expressing a number as a product of prime factors

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 25 of the module booklet.
- Afterwards help the student check the answers and correct any errors.
- Have the student do the Practice Activities.

Suggested Answers

Practice Activities

1. The factors of 14 are 1, 2, 7, 14. Which are prime factors?

1. 2, 7

2. Write the prime factors of each number.

a. 10

2. a. 2, 5

b. 16

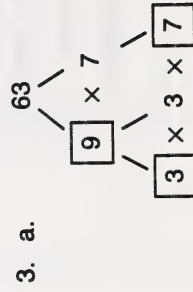
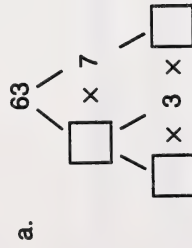
b. 2

c. 24

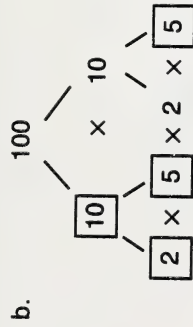
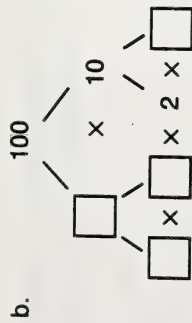
c. 2, 3

Use a calculator to help find factors in Questions 3-7.

3. Complete the factor tree in each of the following.

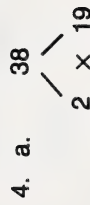




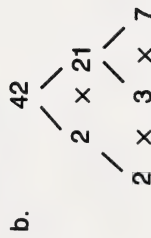


4. Make a factor tree to find the prime factorization for each of these numbers.

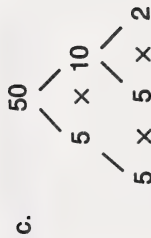
a. 38



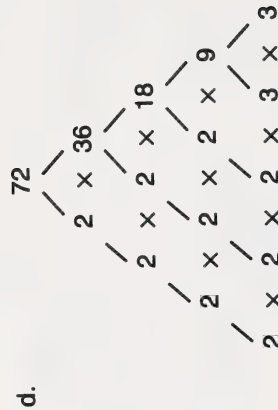
b. 42



c. 50



d. 72



5. a. What is the least prime number? Is it a factor of 75?

5. a. 2, No

b. What is the least prime number that is a factor of 75?

b. 3

c. Divide to find all the prime factors of 75.

c. 3, 5, 25, 75

6. Divide by prime factors to find the prime factorization for each of these numbers.

a. 99

b. 100

c. 108

d. 110

6. a.  $3 \times 3 \times 11$

b.  $2 \times 2 \times 5 \times 5$

c.  $2 \times 2 \times 3 \times 3 \times 3$

d.  $2 \times 5 \times 11$

7. Find the prime factorization for each of these numbers.

a. 39

b. 56

c. 60

d. 288

7. a.  $3 \times 13$

b.  $2 \times 2 \times 2 \times 7$

c.  $2 \times 2 \times 3 \times 5$

d.  $2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$

### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, discuss the Concluding Activities.

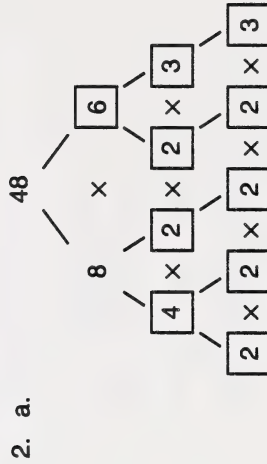
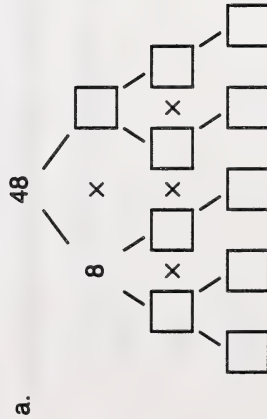
**Extra Practice****Suggested Answers****Computer Alternative**

- Do Lesson 15 of the disk "Numbers and Numeration" for the package *Computer Drill and Instruction: Mathematics, Level D*. Read the instructions in the folder with the disk. Remember, if you need help or have an error, hold down the SHIFT key and press the **?** key.

- Computer checked.

**Print Alternative**

- Complete.



b.

$$\begin{array}{c}
 30 \\
 \swarrow \quad \searrow \\
 \boxed{\phantom{00}} \times 5 \\
 \swarrow \quad \searrow \\
 \boxed{\phantom{00}} \times \boxed{\phantom{00}} \times \boxed{\phantom{00}}
 \end{array}$$

c.  $24 = \boxed{\phantom{00}} \times \boxed{\phantom{00}} \times \boxed{\phantom{00}} \times \boxed{\phantom{00}}$

d.  $75 = \boxed{\phantom{00}} \times \boxed{\phantom{00}} \times \boxed{\phantom{00}}$

b.

$$\begin{array}{c}
 30 \\
 \swarrow \quad \searrow \\
 \boxed{6} \times 5 \\
 \swarrow \quad \searrow \\
 \boxed{2} \times \boxed{3} \times \boxed{5}
 \end{array}$$

c.  $24 = \boxed{2} \times \boxed{2} \times \boxed{2} \times \boxed{3}$

d.  $75 = \boxed{3} \times \boxed{5} \times \boxed{5}$

### Guiding the Student

- Have the student read “Working Together” and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.





## DIVISIBILITY

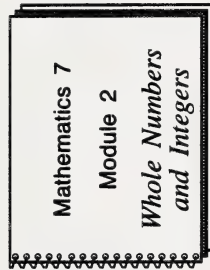
### What Lies Ahead

In this section the student will learn this skill.

- deciding if a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10

### Gathering Materials

For this section the student will need these items.



Mathematics 7

Module 2

*Whole Numbers  
and Integers*



*Computer Drill and Instruction: Mathematics,  
Level D (SRA)  
"Numbers and Numeration"*

(Optional)

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 26 of the module booklet.
- Afterwards help the student check the answers and correct any errors.
- Have the student do the Practice Activities.

**Practice Activities**

1. Which of these numbers is a multiple of 2?

- a. 7434
- b. 8259
- c. 15784
- d. 156432
- e. 24996
- f. 313277

2. Does each of these numbers have 3 as a factor?

- a. 6948
- b. 38117
- c. 938157
- d. 90928
- e. 85524
- f. 283146

**Suggested Answers**

1. Multiples of 2 are even numbers. The numbers are

a, c, d, and e

2. a. Yes

b. No

c. Yes

d. No

e. Yes

f. Yes

3. Does each of these numbers have 5 as a factor?

- a. 19 420
- b. 56 006
- c. 84 757
- d. 92 525
- e. 52 556
- f. 199 340

- 3. a. Yes
- b. No
- c. No
- d. Yes
- e. No
- f. Yes

4. Which numbers in Question 2 are divisible by 6?

- 4. None

5. s each of these numbers a multiple of 10?

- a. 888
- b. 2835
- c. 89 030
- d. 795 485
- e. 277 102
- f. 111 220

- 5. a. No
- b. No
- c. Yes
- d. No
- e. No
- f. Yes

6. Nadine has a piece of material 35 m long to make Batik prints. Each Batik print requires 6 m of material. Can Nadine use all of the material? If not, how much is wasted?

6.  $35 \div 6 = 5 \text{ R}5$

Nadine cannot use all the material. 5 m of material is wasted.



### Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards, check the answers and correct any errors.

**Extra Practice****Computer Alternative**

1. Do Lesson 13 of the disk "Numbers and Numeration" from the package *Computer Drill and Instruction: Mathematics*, Level D. Read the instructions in the folder with the disk. Remember, if you need help or have an error, hold down the SHIFT key and press the **[?]** key.

**Print Alternative**

2. a. Add the digits in 521 361.  
b. Divide the sum by 3.  
c. What is the remainder?  
d. Is 521 361 divisible by 3?  
e. Is 521 361 divisible by 6? Why?

**Suggested Answers**

1. Computer checked.
2. a.  $5 + 2 + 1 + 3 + 6 + 1 = 18$   
b.  $18 \div 3 = 6$   
c. 0  
d. Yes  
e. No; It is not an even number.  
521 361 is not divisible by 2.

3. In each of these cases is the remainder 0? Use the divisibility rules.

a.  $762 \div 10$

b.  $2429 \div 3$

c.  $798 \div 6$

d.  $3336 \div 9$

e.  $841 \div 2$

f.  $6051 \div 5$

3. a. No

b. No

c. Yes

d. No

e. No

f. No

4. Name three 4-digit numbers that are divisible by 9.

4. Many possible answers. The sum of the four digits must be divisible by 9.

**Example:** 3456

$$3 + 4 + 5 + 6 = 18$$

$$18 \div 9 = 2$$

### Guiding the Student

- Have the student do the Concluding Activities.

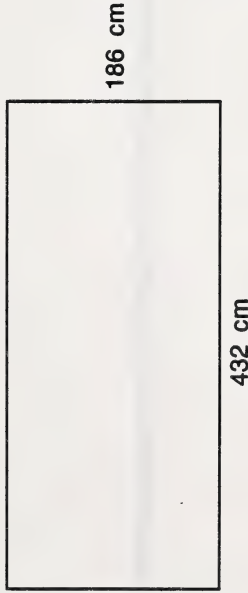
- Afterwards help the student check the answers and correct any errors.



**Concluding Activities**

1. a. If a number is divisible by 2, 5, and 10, what must the last digit be?  
b. What do the divisibility tests for 3 and 9 have in common?
2. A number is divisible by 6 if it is divisible by 2 and 3. Try to discover a divisibility test for 15.

3. Mark has a pane of glass 186 cm by 432 cm. He wants to cut this pane of glass into rectangular pieces measuring 3 cm by 4 cm. Can he use all of the glass?

**Suggested Answers**

1. a. The number must end in a 0.  
b. The sum of the digits must be divisible by 9.
2. The number must be divisible by 3 and 5.
3.  $186 \div 3 = 62$   
 $432 \div 4 = 108$

Yes, he can use all of the glass.



## POWERS

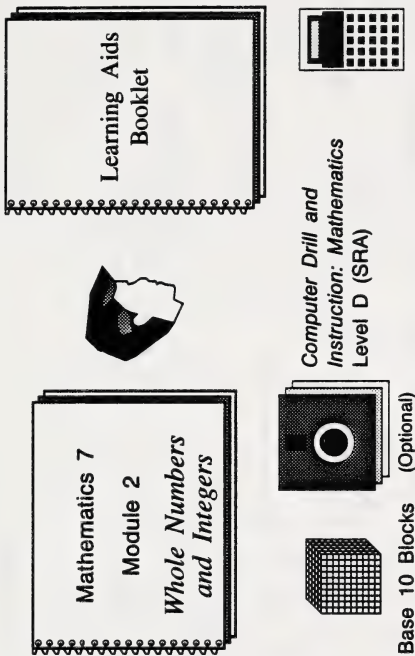
### What Lies Ahead

In this section the student will learn these skills.

- recognizing numbers written as powers
- writing the value of a power
- writing standard numbers as powers

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 27 of the module booklet.
- Then have the student do the Learning Aids Activities (Exercise H in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 27 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities**

1. Complete the table.

**Suggested Answers**

Power	Base	Exponent	Meaning	Standard Form
$7^2$	7	2	$7 \times 7$	49
$3^4$	3	4	$3 \times 3 \times 3 \times 3$	81
$4^3$	4	3	$4 \times 4 \times 4$	64
$6^2$	6	2	$6 \times 6$	36
$10^5$	10	5	$10 \times 10 \times 10 \times 10 \times 10$	100 000
$8^3$	8	3	$8 \times 8 \times 8$	512
$5^3$	5	3	$5 \times 5 \times 5$	125
$2^6$	2	6	$2 \times 2 \times 2 \times 2 \times 2 \times 2$	64

## 2. Express in standard form.

- nine squared
- two cubed
- sixth power of 10
- seven to the fourth power
- $(5 \times 10^3) + (3 \times 10^2) + (2 \times 10^1)$
- $(7 \times 10^3) + (8 \times 10^1) + (4 \times 1)$

- $9^2 = 81$
  - $2^3 = 8$
  - $10^6 = 1\,000\,000$
  - $7^4 = 2401$
  - 5320
  - 7084

## 3. Express as a power.

- 36
- 121
- 625
- 100

- $6^2$
  - $11^2$
  - $5^4$
  - $10^2$

## 4. Write in expanded form using powers.

- 289 376

$$4. \text{ a. } (2 \times 10^5) + (8 \times 10^4) + (9 \times 10^3) + (3 \times 10^2) + (7 \times 10^1) + (6 \times 1)$$

- 1 574 128

$$\text{b. } (1 \times 10^6) + (5 \times 10^5) + (7 \times 10^4) + (4 \times 10^3) + (1 \times 10^2) + (2 \times 10^1) + (8 \times 1)$$

- 90 576

$$\text{c. } (9 \times 10^4) + (5 \times 10^2) + (7 \times 10^1) + (6 \times 1)$$

## Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, check the answers and correct any errors.

# Suggested Answers

## Extra Practice

### Computer Alternative

1. Do Lessons 9 and 10 of the disk "Numbers and Numeration" from the package *Computer Drill and Instruction: Mathematics*, Level D. Read the instructions in the folder with the disk before using the program. If you need help or have an error hold down the SHIFT key and press the **[?]** key.

1. Computer checked.

### Print Alternative

2. Which number is the exponent? Which number is the base?

a.  $2^4$

b.  $9^3$

c.  $5^2$

d.  $3^5$

e.  $10^4$

f.  $6^2$

	Exponent	Base
2. a.	4	2
b.	3	9
c.	2	5
d.	5	3
e.	4	10
f.	2	6



3. Express the number as a power.

a.  $2 \times 2 \times 2 \times 2$

3. a.  $2^4$

b.  $6 \times 6 \times 6$

b.  $6^3$

c.  $3 \times 3 \times 3$

c.  $3^3$

d.  $10 \times 10$

d.  $10^2$

e.  $7 \times 7 \times 7 \times 7 \times 7$

e.  $7^5$

4. Write the number in standard form.

a.  $5^2$

4. a.  $5 \times 5 = 25$

b.  $5^3$

b.  $5 \times 5 \times 5 = 125$

c.  $5^4$

c.  $5 \times 5 \times 5 \times 5 = 625$

d. the sixth power of 5

d.  $5^6 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 15625$

5. Fill in the blanks. One has been done as an example.

a.  $27 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

a.  $27 = 3 \times 3 \times 3 = 3^3$

b.  $64 = 4 \times 4 \times 4 = \underline{\hspace{1cm}}$

b.  $64 = 4 \times 4 \times 4 = 4^3$

c.  $1000 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

c.  $1000 = 10 \times 10 \times 10 = 10^3$

d.  $4096 = 8 \times 8 \times 8 \times 8 = \underline{\hspace{1cm}}$

d.  $4096 = 8 \times 8 \times 8 \times 8 = 8^4$

6. Expanded form uses powers of 10. Write the standard form.

a.  $(8 \times 10^4) + (9 \times 10^3) + (3 \times 10^1)$

a. 89 030

b.  $(4 \times 10^3) + (5 \times 10^2) + (6 \times 10^1) + (7 \times 1)$

b. 4567

### Guiding the Student

- Have the student read “Working Together” and do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

**Concluding Activities**

1. Evaluate the following on paper. Then use your calculator to get the same answer.

a.  $7^2$

b.  $158^2$

c.  $5^3$

d.  $25^4$

e.  $4^6$

2. A number that can be written with an exponent of 2 is called a square. For example, 36 is a square because it can be expressed as  $6^2$ . List 5 other squares.

**Suggested Answers**

1. a.  $7 \times 7 = 49$

b.  $158 \times 158 = 24\,964$

c.  $5 \times 5 \times 5 = 125$

d.  $25 \times 25 \times 25 \times 25 = 390\,625$

e.  $4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4\,096$

2. There are many possible answers. These are but a few.

$64 = 8^2$

$81 = 9^2$

$100 = 10^2$

$121 = 11^2$

$144 = 12^2$

3. There are many different expressions for 81. Here are a few.

$$3 \times 27$$

$$243 \div 3$$

$$9 \times 9$$

$$405 \div 5$$

$$45 + 36$$

$$9^2$$

$$40 + 41$$

$$3^4$$

$$85 - 4$$

$$8^2 + 17$$

$$100 - 19$$

$$10^2 - 19$$

Give 10 different expressions for 16. (Some of the expressions should include powers.)

3. There are many possible answers. These are but a few.

a.  $20 - 4$

b.  $4^2$

c.  $2^4$

d.  $3^2 + 7$

e.  $2^6 \div 2^2$

f.  $2^2 \times 2^2$

g.  $12 + 4$

h.  $32 \div 2$

i.  $128 \div 8$

j.  $2 \times 2^3$

## RECOGNIZING INTEGERS

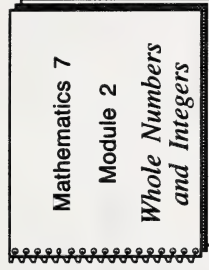
### What Lies Ahead

In this section the student will learn this skill.

- interpreting integers

### Gathering Materials

For this section the student will need these items.




*Computer Drill and Instruction: Mathematics, Level D (SRA) "Pre-Algebra"*

(Optional)

### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 28 of the module booklet.
- Have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

**Practice Activities****Computer Alternative**

1. Do Lessons 11 and 12 of the "Pre-Algebra" disk in the SRA *Computer and Instruction: Mathematics*, Level D package. Read the instructions in the folder with the disk. Remember to hold down the SHIFT key and press the  key when you need help or have a question.

**Print Alternative**

2. Write the positive or negative number for each of the following situations.

- a.  $5^{\circ}\text{C}$  below freezing
- b. 1 floor below ground level
- c. 30 m above sea level
- d. 3 extra points
- e. 6 steps in front of
- f. 50 m below sea level
- g. 6 paces behind
- h. 1 under par

**Suggested Answers**

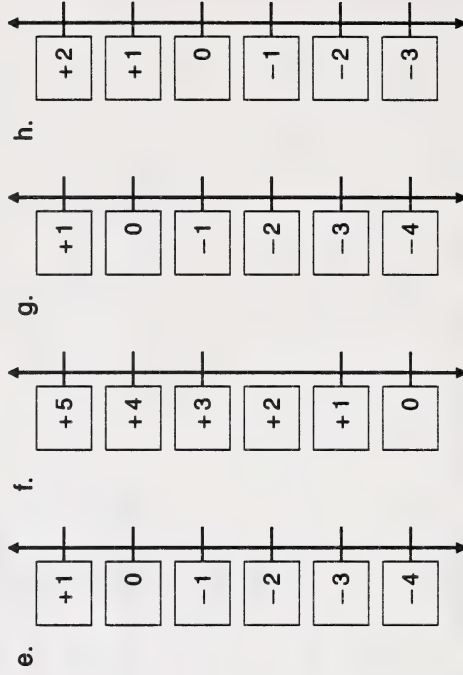
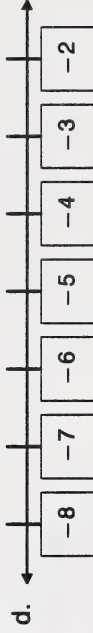
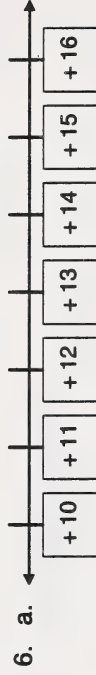
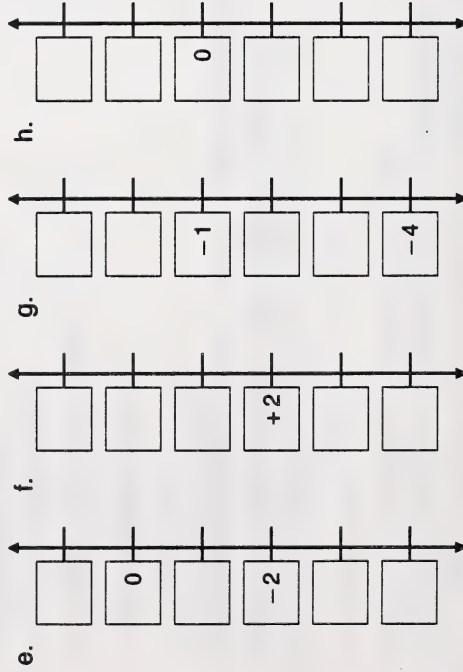
1. Computer checked.

2.
  - a.  $-5$
  - b.  $-1$
  - c.  $+30$  or  $30$
  - d.  $+3$  or  $3$
  - e.  $+6$  or  $6$
  - f.  $-50$
  - g.  $-6$
  - h.  $-1$

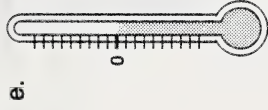
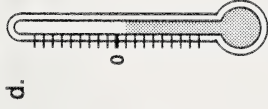
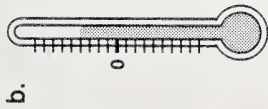
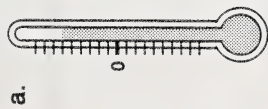


3. In a game, Dennis scored 28 points and Eileen scored 15. Jim lost 25 points and Theresa lost 13. Represent the scores with positive and negative numbers.
4. Kathy uses positive numbers to represent money she receives each week. She uses negative numbers for money she needs to spend. Write the number Kathy uses for each of these cases.
- a. babysitting: \$10
  - b. entertainment: \$4
  - c. snacks: \$3
  - d. allowance: \$5
  - e. music tape: \$8
5. Name the pair of opposites that are included in each of these lists.
- a. +400, +40, -4, +4
  - b. +17, +7, -17, +71
3. +28 or 28, +15 or 15, -25, -13
4. a. +10 or 10  
b. -4  
c. -3  
d. +5 or 5  
e. -8
5. a. -4, +4  
b. +17, -17

6. Complete each number line by putting an integer in each box.



7. A thermometer is really a vertical number line. What is the temperature in degrees Celsius on each of these thermometers?



7. a.  $+6^{\circ}\text{C}$  or  $6^{\circ}\text{C}$   
 b.  $+4^{\circ}\text{C}$  or  $4^{\circ}\text{C}$   
 c.  $-7^{\circ}\text{C}$   
 d.  $-1^{\circ}\text{C}$   
 e.  $0^{\circ}\text{C}$

8. Use  $>$  or  $<$  to make a true statement for each of these.

a.  $+6$    $+1$

b.  $-5$    $+2$

c.  $-6$    $-2$

d.  $+1$    $-2$

e.  $-2$    $-6$

f.  $-2$    $+8$

8. a.  $>$

b.  $<$

c.  $<$

d.  $>$

e.  $>$

f.  $<$

9. Arrange each group of integers from least to greatest.

a.  $+2, -1, 0, +7, -5$

b.  $-7, +1, -4, +3, +2$

9. a.  $-5, -1, 0, +2, +7$

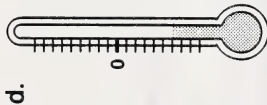
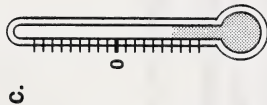
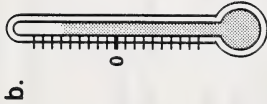
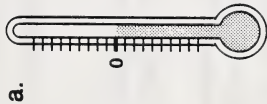
b.  $-7, -4, +1, +2, +3$

### Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

### Concluding Activities

1. Compare the thermometers below with the thermometer directly to the right. Did the temperature increase or decrease in each case? How much?



1. a. 0

b. +6

c. -6

d. -6

e. +6

2. **Longitude** is distance, in degrees, east or west on the Earth's surface.

Earth rotates once or goes through or  $360^\circ$  every 24 hours. Therefore each  $15^\circ$  zone around the globe has a difference of 1 hour in time.

Greenwich, England, has longitude  $0^\circ$ . The time for places in the zone  $30^\circ$  west of Greenwich is 2 hours earlier. The time for places in the zone  $45^\circ$  east of Greenwich is 3 hours later.

The following map shows the approximate location of the 24 time zones. The numbers indicate clock changes earlier or later than Greenwich time.

Give the time change for each distance as a positive or negative number.

- |                            |           |
|----------------------------|-----------|
| a. London to Sydney        | 2. a. +10 |
| b. London to Halifax       | b. -4     |
| c. New Delhi to Tokyo      | c. +4     |
| d. Tokyo to Rio de Janeiro | d. -12    |
| e. Edmonton to Cape Town   | e. +8     |
| f. Halifax to Buenos Aires | f. 0      |



## ADDING INTEGERS

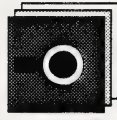
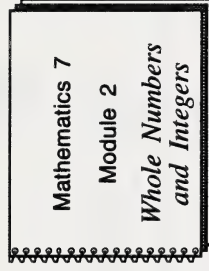
### What Lies Ahead

In this section the student will learn these skills.

- adding integers using learning aids
- adding integers using number lines

### Gathering Materials

For this section the student will need these items.



(Optional)



Computer Drill and Instruction:  
Mathematics, Level D (SRA)  
"Pre-Algebra"



### Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 29 of the module booklet.
- Have the student do the Introductory Activities.
- Afterwards help the student check the answers and correct any errors.

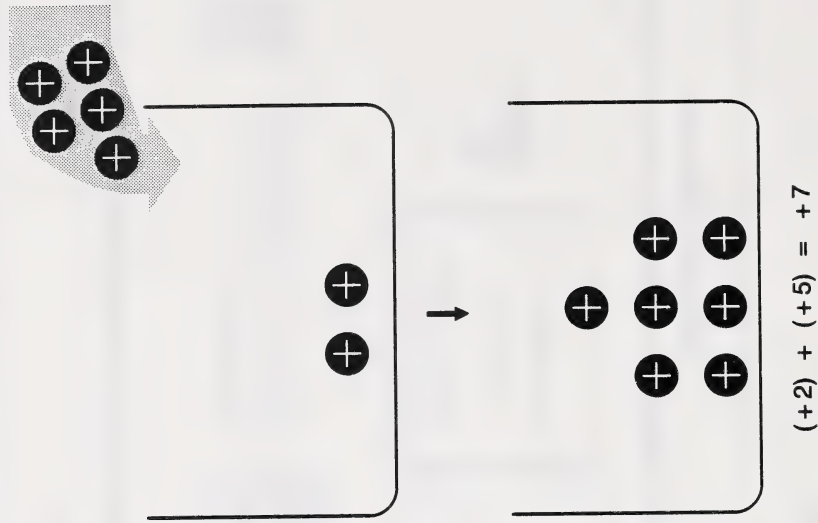
**Introductory Activities**

1. Use the counters at the end of this section (or use checkers or two-coloured bingo chips) to model these sums.

a.  $(+2) + (+5) =$  \_\_\_\_\_

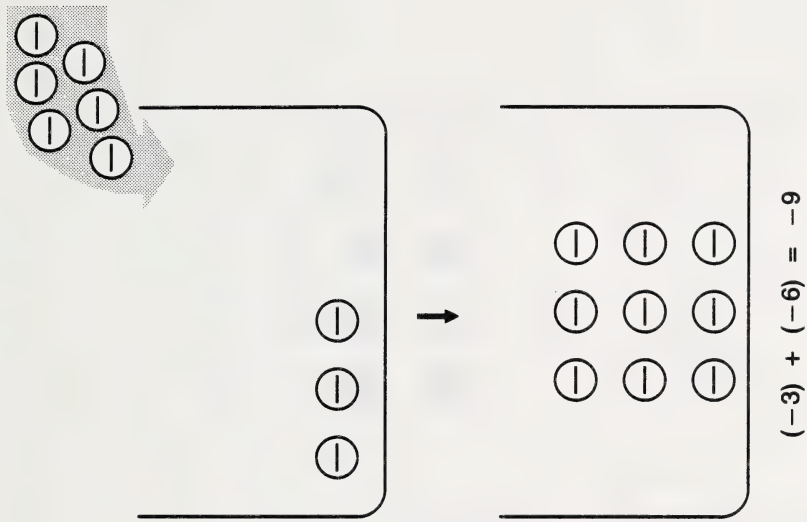
**Suggested Answers**

1. a.



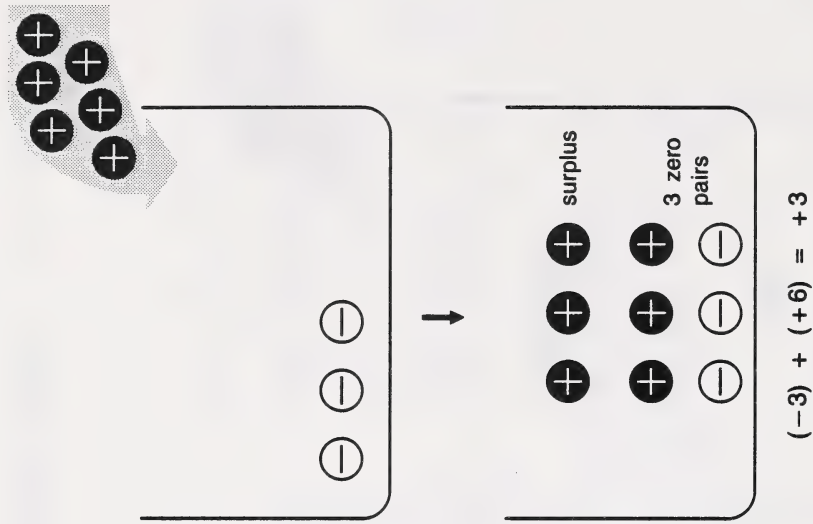
b.  $(-3) + (-6) =$  \_\_\_\_\_

b.



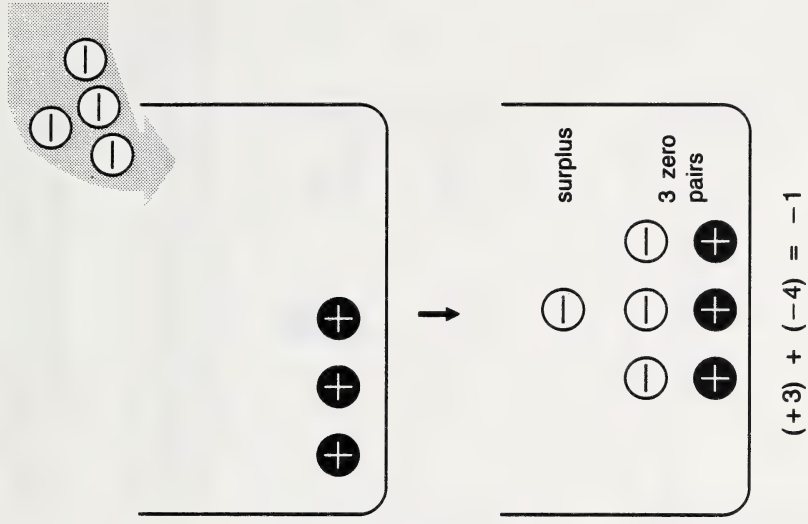
c.  $(-3) + (+6) =$  \_\_\_\_\_

c.



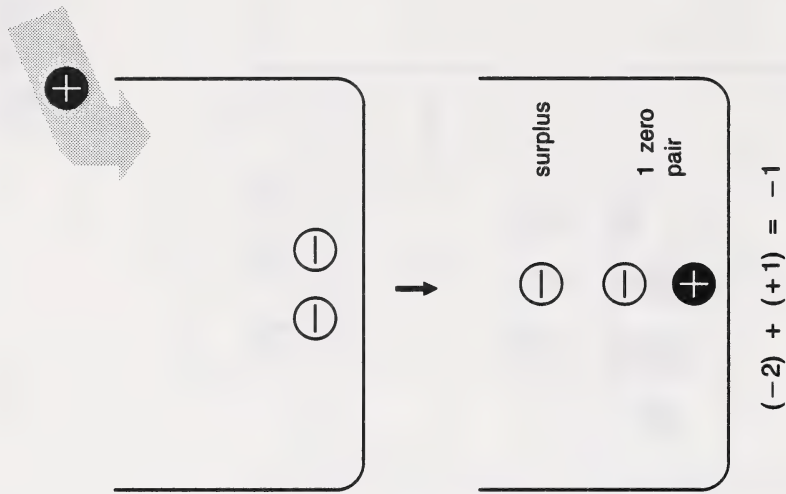
d.  $(+3) + (-4) = \underline{\hspace{2cm}}$

d.



e.  $(-2) + (+1) = \underline{\hspace{2cm}}$

e.





2. a. What pattern occurs when you add counters with like signs?
- b. What pattern occurs when you add counters with unlike signs?
2. a. The number in the answer is the **sum** of the counters, and the answer has the **same sign** as the counters.
- b. The number in the answer is the **difference** between the positive and negative counters, and the answer has the same sign as the **surplus** counters.

3. Use the patterns in question 2 to predict the following sums.

a.  $(+7) + (+1)$

b.  $(-3) + (-6)$

c.  $(-4) + (+9)$

d.  $(+2) + (-2)$

e.  $(-6) + (+3)$

3. a.  $+8$

b.  $-9$

c.  $+5$

d.  $0$

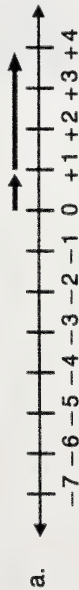
e.  $-3$

### Guiding the Student

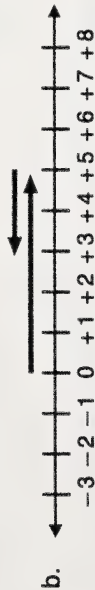
- Have the student read “Working Together” and do the Practice Activities.
- Afterwards, help the student check the answers and correct any errors.

**Practice Activities**

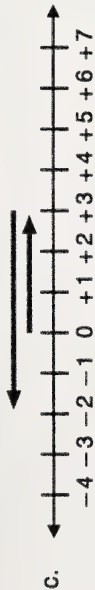
1. Write the addition sentence suggested by the arrow on the number line.



1. a.  $(+1) + (+3) = +4$



b.  $(+5) + (-2) = +3$



c.  $(+3) + (-5) = -2$



d.  $(-8) + (+5) = -3$

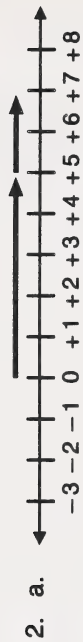


e.  $(-2) + (-6) = -8$

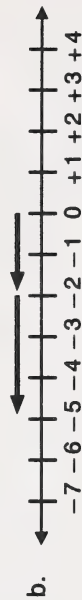
**Suggested Answers**

2. Use arrows on a number line to show these sums.

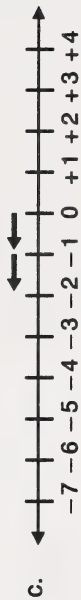
a.  $(+5) + (+2)$



b.  $(-2) + (-3)$



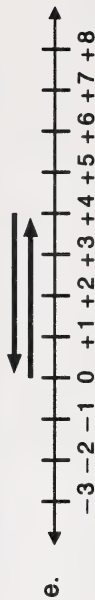
c.  $(-1) + (-1)$



d.  $(-6) + (+5)$



e.  $(+4) + (-4)$



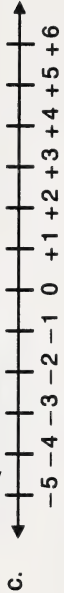
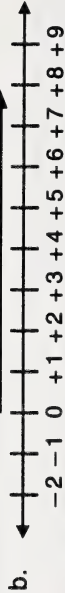
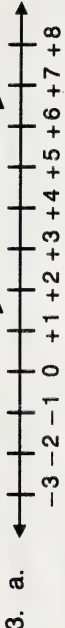
3. Draw a number line to show the events.

- a. a growth of 2 cm followed by a growth of 5 cm



- b. a temperature rise of 8°C followed by a drop of 5°C

- c. a withdrawal of \$5 followed by a deposit of \$10



4. Write a number sentence describing the events in question 3 above. Give the correct answer.

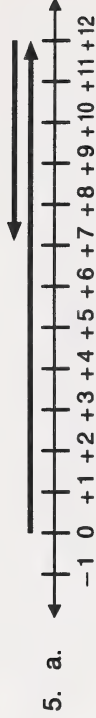
4. a.  $(+2) + (+5) = +7$

b.  $(+8) + (-5) = +3$

c.  $(-5) + (+10) = +5$

5. Solve. Show a number sentence for each problem.

- a. The temperature at 3 o'clock was  $12^{\circ}\text{C}$ . By 9 o'clock it had fallen  $5^{\circ}\text{C}$ . What was the temperature at 9 o'clock?

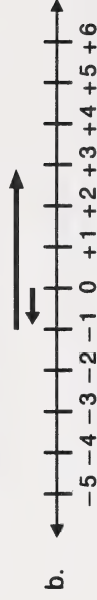


$$(+12) + (-5) = +7$$

The temperature was  $7^{\circ}\text{C}$ .



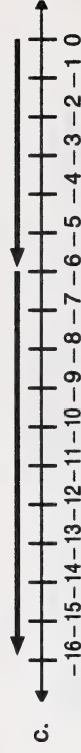
- b. Colonel Bogey scores  $-1$  on his first hole of golf and  $+4$  on the next. What is his score after the two holes have been played?



$$(-1) + (+4) = +3$$

His score was  $+3$ .

- c. Felina lost 6 marbles in one game and then lost 10 more in another game. What was her total loss?



$$(-6) + (-10) = -16$$

Her total was a loss of 16 marbles.

### Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.



**Concluding Activities****Suggested Answers**

Complete the following Magic Square.

Remember that in a magic square every row, column, and diagonal must add to the same number.

$-4$	$17$	$2$
$11$	$5$	$-1$
$8$	$-7$	$14$



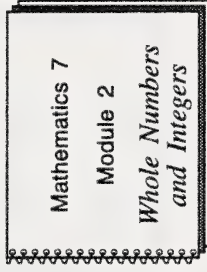
## SUMMARY

### What Lies Ahead

In this summary the student will review the skills taught in Part Three.

### Gathering Materials

For this section the student will need these items.



### Guiding the Student

- Have the student turn to Section 30 in the module booklet and review the skills taught in Part Three.
- Then have the student turn to Section 21 to review the pretest and to correct any errors.



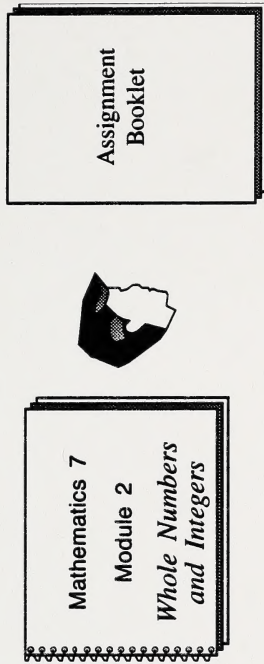
## MODULE CONCLUSION

### What Lies Ahead

The student is now ready to do the assignment in the assignment booklet. The student will be graded on the work done in this booklet.

### Gathering Materials

The student will need the following items.



Base 10 Blocks



### Guiding the Student

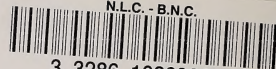
- Have the student complete the assignment independently. The student may use resource material, but cannot get help. The student should attempt all parts of the assignment.
- Afterwards, you should both sign the declaration and you should submit the assignment booklet to the Alberta Distance Learning Centre for a grade and feedback.







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